ADSL2/2+ IAD
Freeway DSL User's Manual

Revision 0.3
March 2008

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1. Introduction

The Freeway DSL ADSL2/2+ Wireless Ethernet Router is a highly integrated, voice enabled broadband residential gateway that is positioned to enhance the user's broadband experience. This new generation of platforms not only eases the deployment of DSL-based residential gateways but also provides new opportunities for the service provider to derive additional value from the emerging VoIP service.

The capabilities of the Freeway DSL allow for some highly advanced applications beyond just typical DSL, but also WLAN access points and VoIP. Benefiting from the fact the Freeway DSL also connects to a POTS line for a life line back up, some of these applications can provide a competitive advantage over equivalent cable modem services. Also, given the inclusion of a powerful processor and a WLAN connection, these services can be managed from virtually anywhere in the home through an easy to use web-GUI management interface.

1.1 Features

- Compliant to DSL Forum TR-048, TR-067 and TR-100 Interoperability Test
- Feature-Rich TR-069 supports Remote Registration / Remote Authentication / Remote Configuration
- Complete solution for integration of ADSL, Router, Switch, WLAN, VoIP and DECT
- WPS (Wi-Fi Protected Setup) support for easy WLAN client setup
- STUN and Outbond Proxy for NAT Traversal
- POTS Lifeline relay for power failure telephony operation
- T.38 fax support
- System management includes SNMP v1, v2, Telnet command line interface and web interface
- User can browse the Internet while talking on the phone simultaneously
- Firmware upgrade through web management
- Remote / Local configuration & management through Web / Telnet configuration & management

1.2 System Requirement

In order to use the Freeway DSL, you must have the following:

- ADSL service up and running on your telephone line
- At least one activated SIP account for VoIP service
- One or more computers each containing an Ethernet 10Base-T/100Base-T network interface card (NIC)
- For system configuration using the supplied web-based program: a web browser such as Internet Explorer v 5.0 (or later), Firefox v2.0 (or later) and Netscape v 6.1 (or later).

2. Freeway DSL Overview

Your Freeway DSL has ports, switches and LEDs. The features are listed below.

2.1 Ports and Buttons

POWER: Connecter for a power adapter. Using a power supply with a different voltage rating will damage this product. Make sure to observe the proper power requirements. The power requirement is 12 volts.

USB: Connector for USB devices like memory stick.

LAN1-4: Connector for Ethernet network devices, such as a PC, hub, switch, or router.

DSL: Connecter for accessing the Internet through ADSL line.

PSTN: Connector of PSTN life line.

PHONE1-2: Connecter of analog phone for VoIP communication.

RESET: Restore the default settings. You may need to place the Freeway DSL into its factory defaults if the configuration is changed, you loose the ability to enter the Freeway DSL via the web interface, or following a software upgrade, and you loose the ability to enter the Freeway DSL. To reset the Freeway DSL, simply press the reset button for more than 5 seconds. The Freeway DSL will be reset to its factory defaults and after about 30 seconds the Freeway DSL will become operational again.

Warning: Incorrectly connecting telephony devices to the RJ-11 (phone) port on the Telephony Interface can cause permanent damage to the Freeway DSL.

2.2 LED and WPS Push Button Description

LED	Status	Description
ALARM	**On**	When a line fault condition on the VoIP connection. (This will occur if the outside world phone line is accidentally plugged into the VoIP jack.)
	Off	The VoIP connection is working properly.
VOIP1-2	**On**	This VoIP line/port is off hook (the handset of phone is hanging).
	Flash	A phone call is in or out via VoIP line/port.
	Off	This VoIP line/port is on-hook or unused.
PSTN	**On**	The device is connected to a PSTN outlet.
	Flash	A phone call is in or out via PSTN line/port.
	Off	The device is not connected to a PSTN outlet.
INTERNET	**On**	The device is successfully connected to Internet.
	Flash	The device is sending/receiving data from Internet.
	Off	The WAN port is not connected to Internet.
DSL	**On**	The device is successfully linked with ADSL line (DSLAM).
	Flash	The device is trying to link with ADSL line (DSLAM).
	Off	The device is not linked with ADSL line (DSLAM).
USB	**On**	A USB device is connected to the USB port.
	Flash	The connected USB device is sending/receiving data via USB port.
	Off	No USB device is connected to the USB port.
LAN1-4	**On**	The LAN port is connected to Ethernet device.
	Flash	The data is sending/receiving via this LAN port.
	Off	The LAN port is not connected to Ethernet device.
WLAN	**On**	The device is ready for wireless clients to connect.
	Flash	The data is sending/receiving via wireless.
	Off	The device is not ready for wireless clients to connect.
POWER	**ON**	The device is power on.
	Off	The device is power off.
WPS	**On**	The device is in wireless configuration process.
	Off	The device is not process any wireless configuration.
WPS Button	Push the WPS button for about 4 seconds, the WPS LED will then light up and flashing. At this moment, click the PBC button in the wireless client software, the wireless client will then scan and connect to the AP (Freeway DSL) automatically.	

2.3 Installing your Freeway DSL

1. Locate an optimum location for the Freeway DSL.
2. For connections to the Ethernet and DSL interfaces, refer to the Quick Start Guide.
3. Connect the Power Adapter. Depending upon the type of network, you may want to put the power supply on an uninterruptible supply. Only use the power adapter supplied with the Freeway DSL. A different adapter may damage the product.

Now that the hardware installation is complete, continue on to set up your Freeway DSL.

3. Setting up Your Freeway DSL

This section guides you through configuring your Freeway DSL. Before setting up your Freeway DSL, make sure you have followed the Quick Start Guide. You should have your computers configured for DHCP mode and have proxies disabled on your browser. If you do not get the page as shown below, you may need to delete your temporary Internet files by flushing the cached web pages.

3.1 Log into Your Freeway DSL

Use the following procedures to log in to your Freeway DSL.

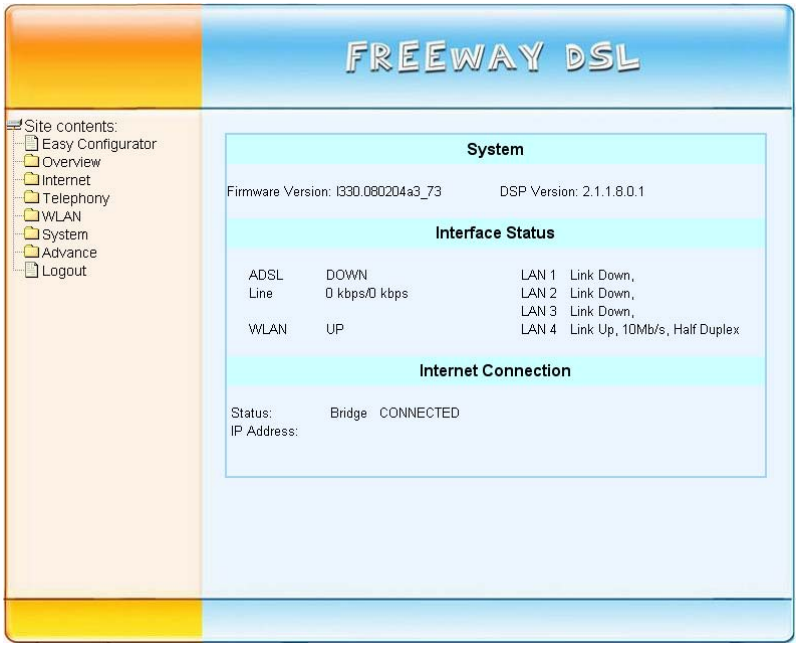
1. Open your web browser. Type the default IP address of the Freeway DSL **http://192.168.1.1** and press Enter.
   The Welcome page appears.

2. Enter user name as **admin** and password as **admin** (case sensitive).
3. Click **LOGIN**.
   The main page appears.

Note

*You can change the password in **System->Password** page at any time.*

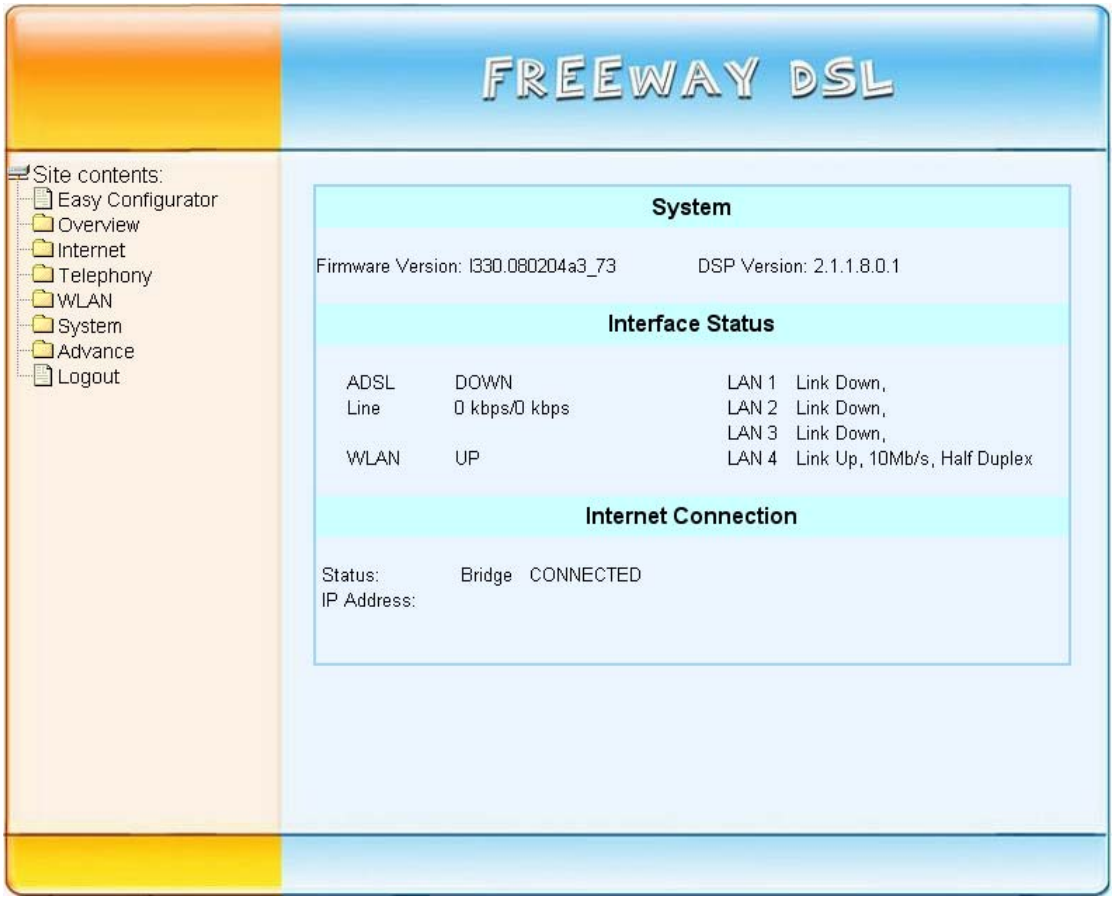
The Web Application is displayed as shown below. This page displays the Freeway DSL's current status.



4. Web Configuration

4.1 Overview

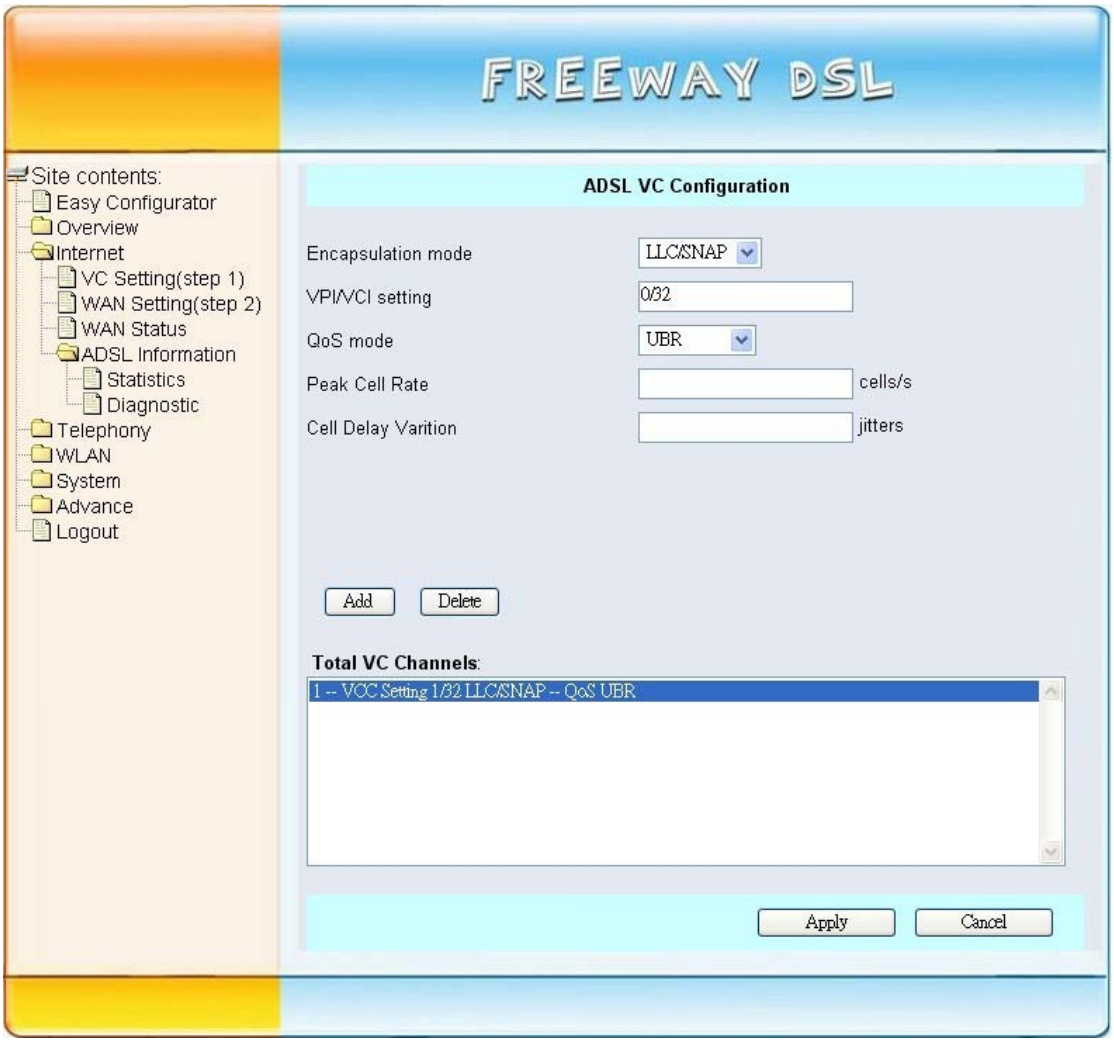
This page displays the firmware version, DSP version, interface status and Internet connection. This information will vary depending on the Internet connection status.



4.2 Internet

4.2.1 VC Setting (Step 1)

The Freeway DSL supports multiple channel operation modes and is bridge mode enabled by factory default. There is a 1483-bridged mode PVC 1/32 in system.

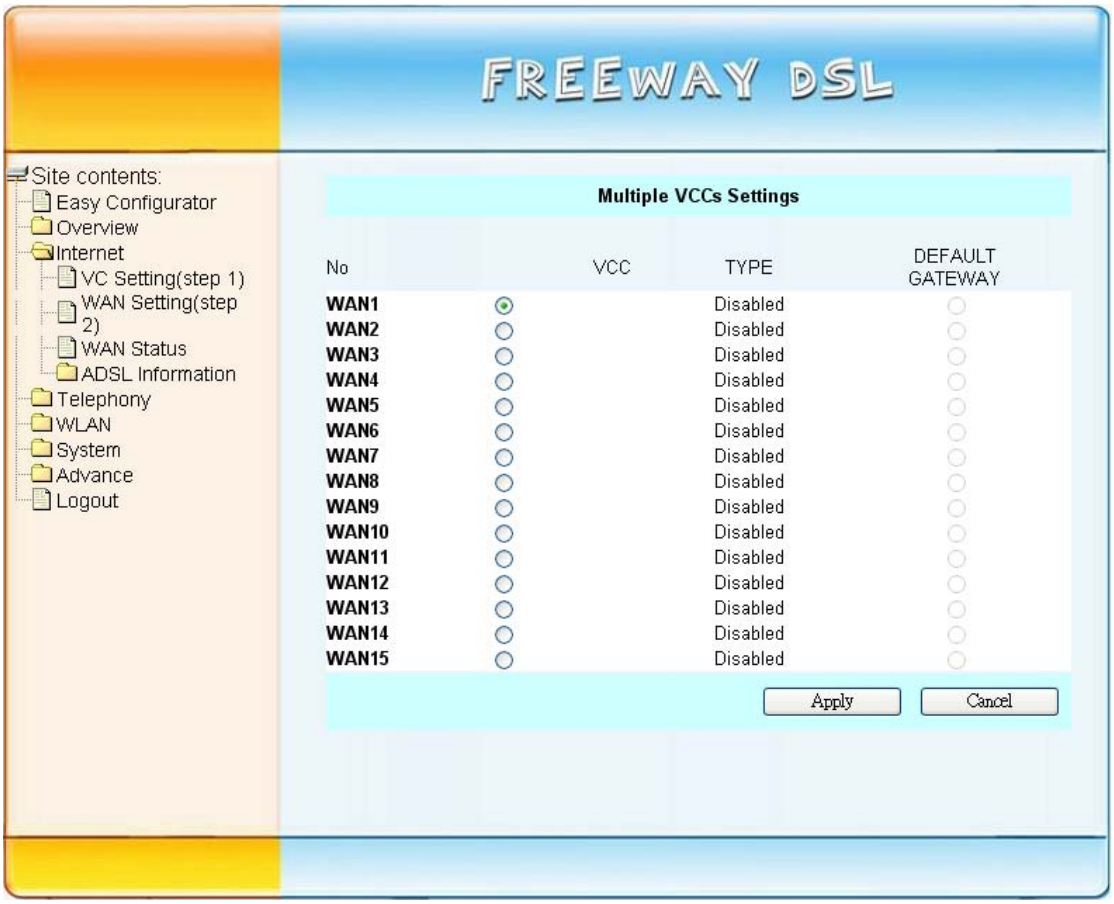


Field	Description
Encapsulation Mode	The encapsulation can be configured to: • LLC/SNAP • VCMUX
VPI/VCI setting	Freeway DSL support the full range of VPI/VCI meaning: • VPI range 00_H - FF_H • VCI range 0000_H -$FFFF_H$ Click on **Add** to add the parameters specified in all the 3 fields.

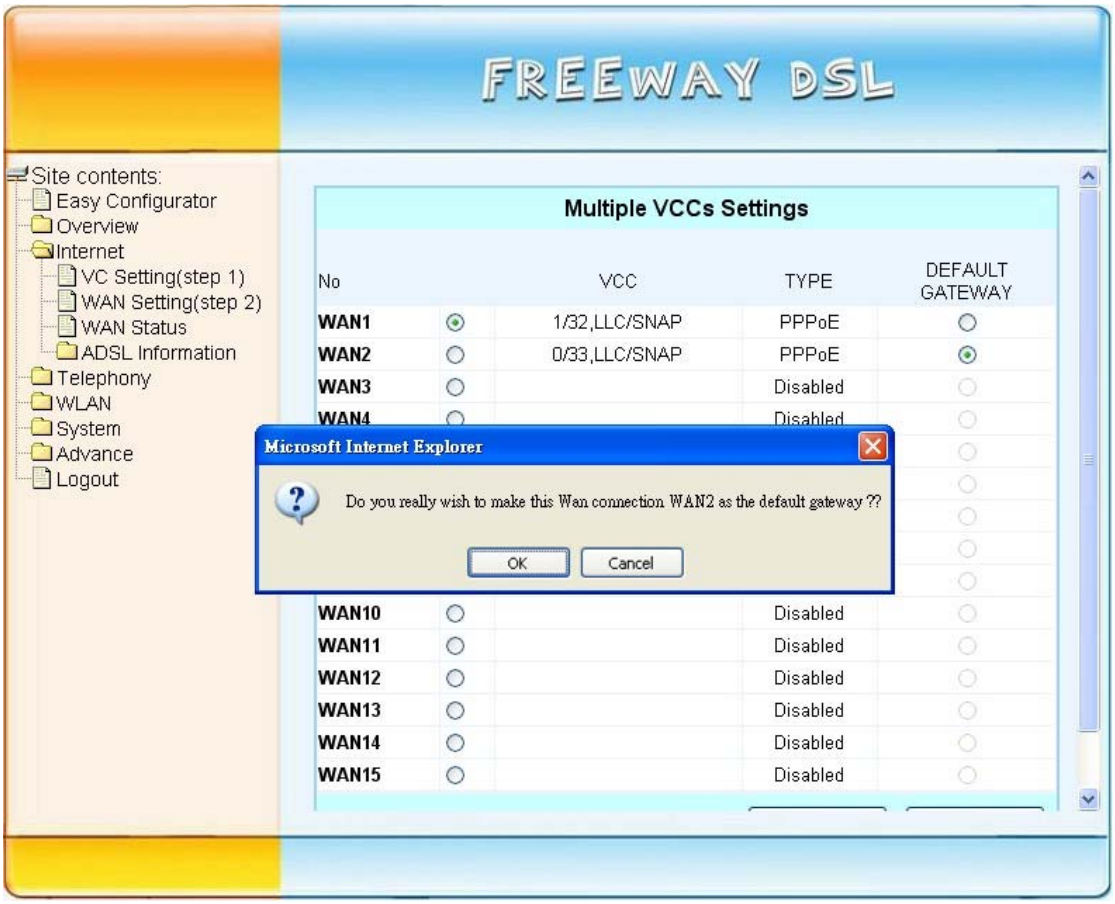
QoS Mode	Freeway DSL Supports the following ATM QoS traffic classes per VC: • **UBR**: Unspecified Bit Rate. • **CBR**: Constant Bit Rate. • **NRT-VBR**: Variable Bit Rate-non real time. When you select this option for QoS mode, the following additional fields become available: Minimum Cell Rate, Sustainable Cell Rate, Maximum Burst Size. • **RT-VBR**: Variable Bit Rate-real time. When this option is selected for QoS mode, the following additional fields become available: Sustainable Cell Rate, Maximum Burst Size. • **UBR+**: This is a special service class derived from UBR. When QoS Mode is set to this option, the following field appears additionally: Minimum Cell Rate.
Peak Cell Rate	This parameter is required for all ATM traffic classes and is configured in cells/s.
Cell Delay Variation	This parameter is required for VBR-rt (Variable Bit Rate - real time) connections. It will only be displayed for this traffic class. The value is specified in ms to specify the maximum allowed jitter.

4.2.2 WAN Setting (Step 2)

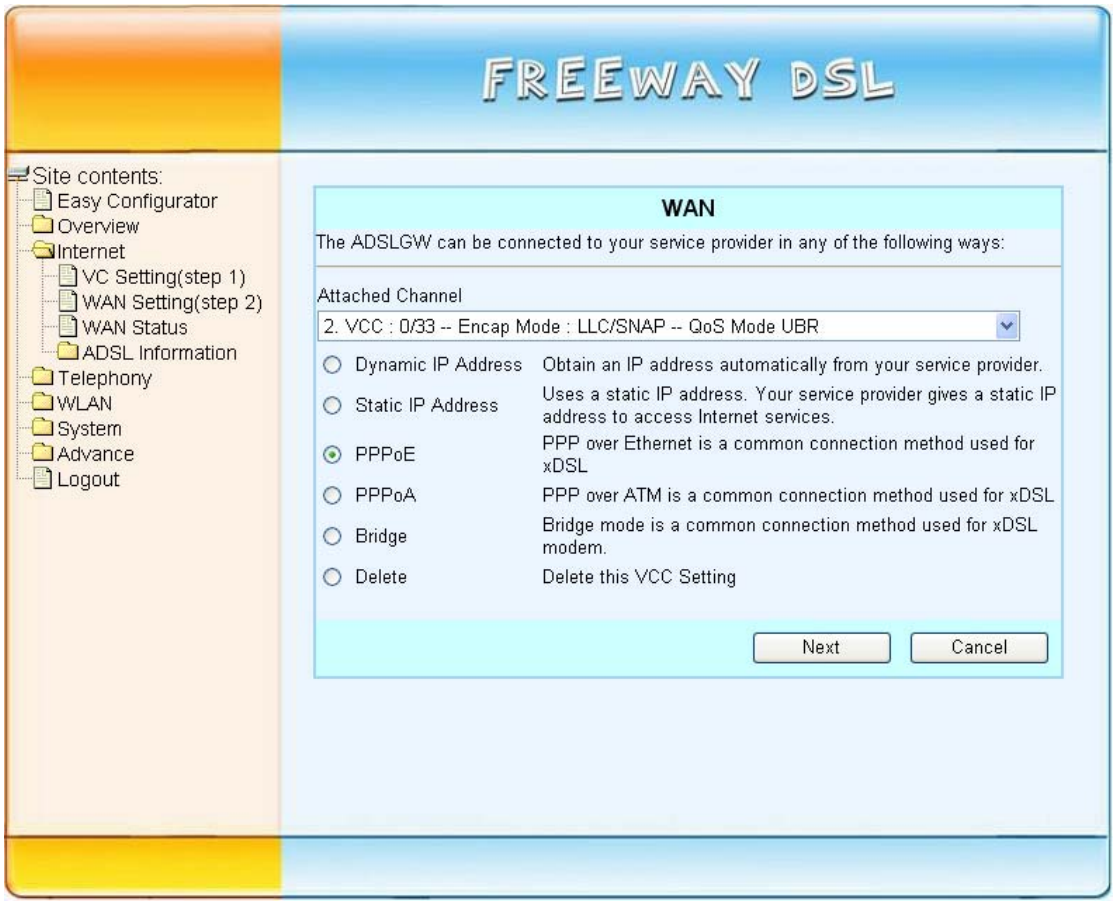
This page allows you to configure multiple VCCs and shows the default interface and the default gateway configured on the device. Freeway DSL supports up to 15 VCCs. You can click on any of the radio buttons to select the default interface or the default gateway.



You can choose one of the WAN interfaces being configured and then click **APPLY**. The WAN configuration screen will then displayed as shown below.
This page shows the action performed on clicking any radio button for default interface or default gateway. Once you click on any of the radio buttons you will be asked to confirm the same. If click OK the default interface or the default gateway will be configured on the WAN connection selected. Otherwise changes will not be applied.

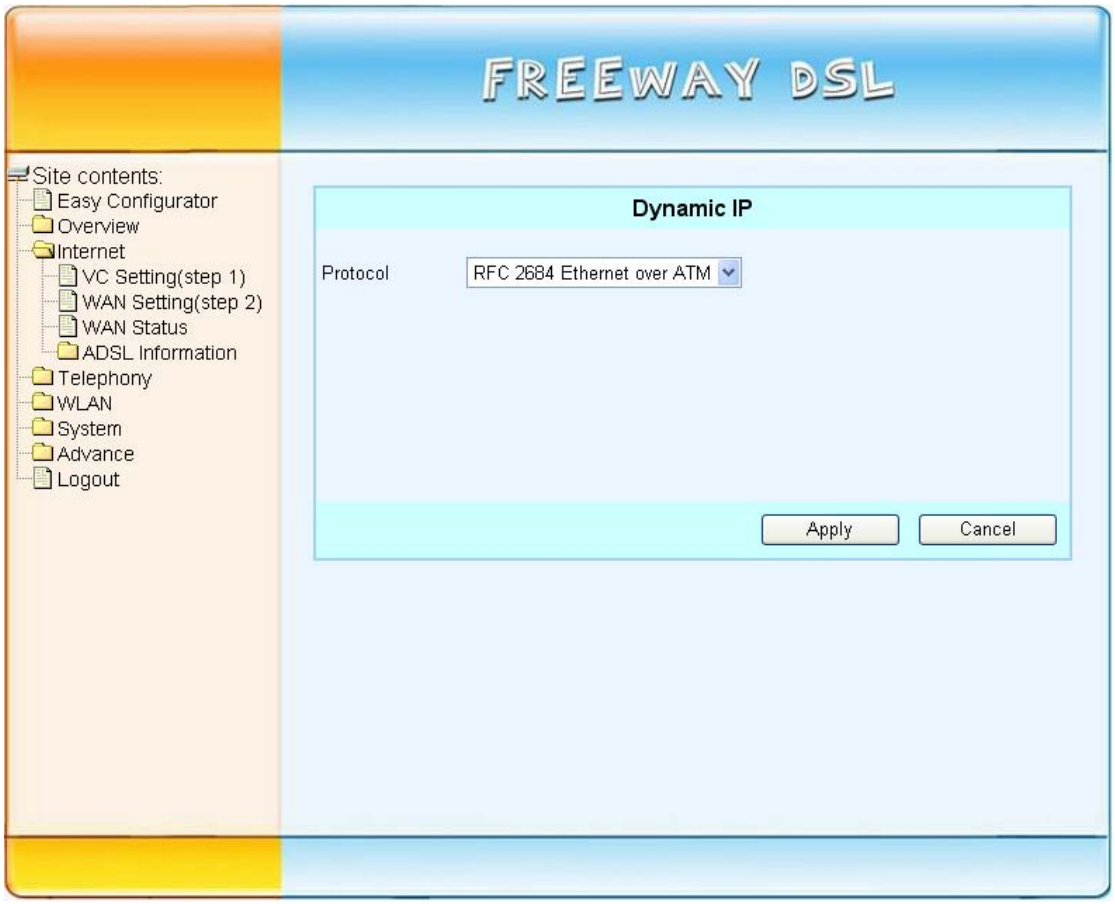


The WAN Settings screen contains the details as shown below.


FREEWAY DSL
Site contents:
Easy Configurator
Overview
Internet
VC Setting(step 1)
WAN Setting(step 2)
WAN Status
ADSL Information
Telephony
WLAN
System
Advance
Logout
WAN
The ADSLGW can be connected to your service provider in any of the following ways:
Attached Channel
2. VCC : 0/33 -- Encap Mode : LLC/SNAP -- QoS Mode UBR
Dynamic IP Address
Obtain an IP address automatically from your service provider.
Static IP Address
Uses a static IP address. Your service provider gives a static IP address to access Internet services.
PPPoE
PPP over Ethernet is a common connection method used for xDSL
PPPoA
PPP over ATM is a common connection method used for xDSL
Bridge
Bridge mode is a common connection method used for xDSL modem.
Delete
Delete this VCC Setting
Next
Cancel

Field	Description
Attached Channel	This is the PVC being configured.
Dynamic IP Address	Obtain an IP address automatically from your service provider.
Static IP Address	Uses a static IP address. Your service provider gives a static IP address to access Internet services.
PPPoE	PPP over Ethernet is a common connection method used for xDSL.
PPPoA	PPP over ATM is a common connection method used for xDSL.
Bridge	Bridge mode is a common connection method used for xDSL modem.
Delete	To delete this VCC setting.

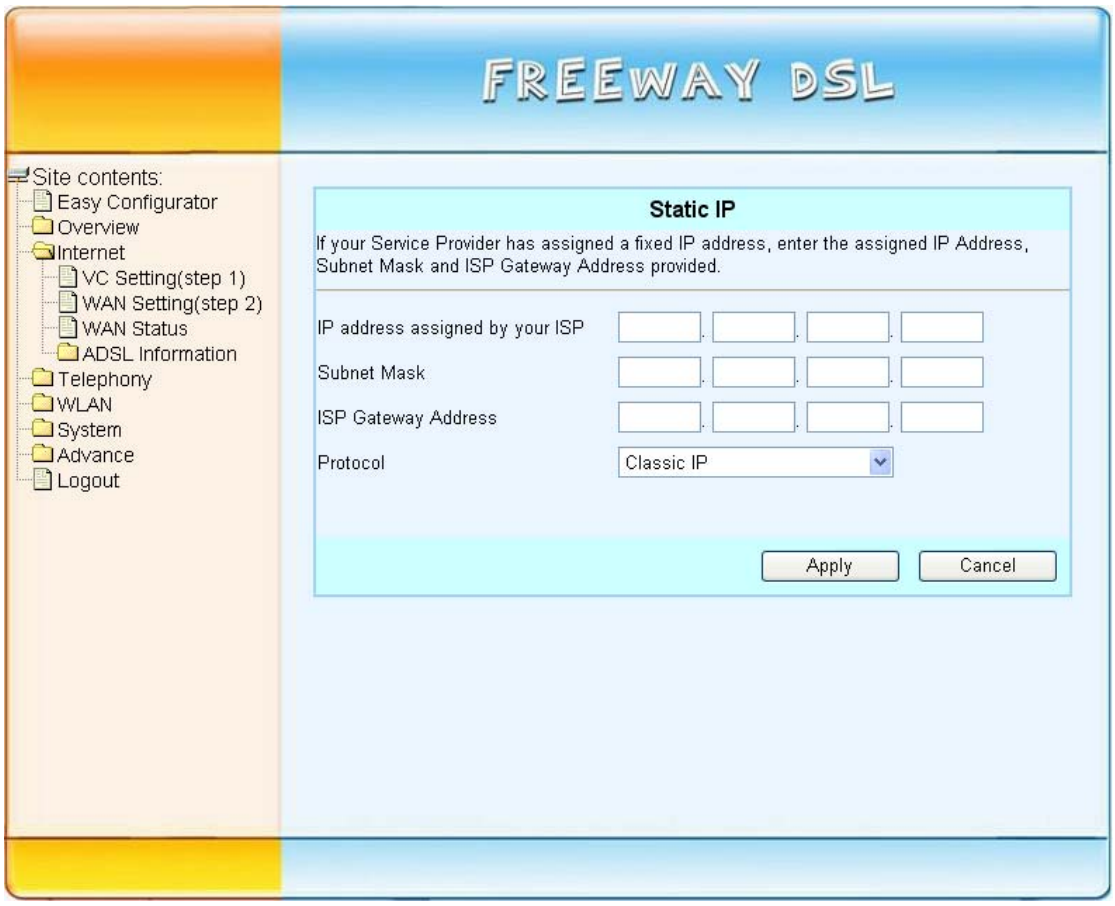
Dynamic IP
To configure the WAN interface to dynamically obtain an IP address, select the **Dynamic IP Address** button on the **WAN settings** page and click **Next**. A screen is displayed as shown below.



Field	Description
Protocol	This option allows to select the protocols: • RFC 2684 Ethernet over ATM • RFC 2364 IP over ATM
VLAN ID	To enter the VLAN ID for which membership needs to be added for the selected port.
VLAN Priority	Specify the priority of VLAN.
TAG	Tagging outgoing frames with VLAN-Tagged.
UN-TAG	Untagging outgoing frames with VLAN-Tagged.

Static IP

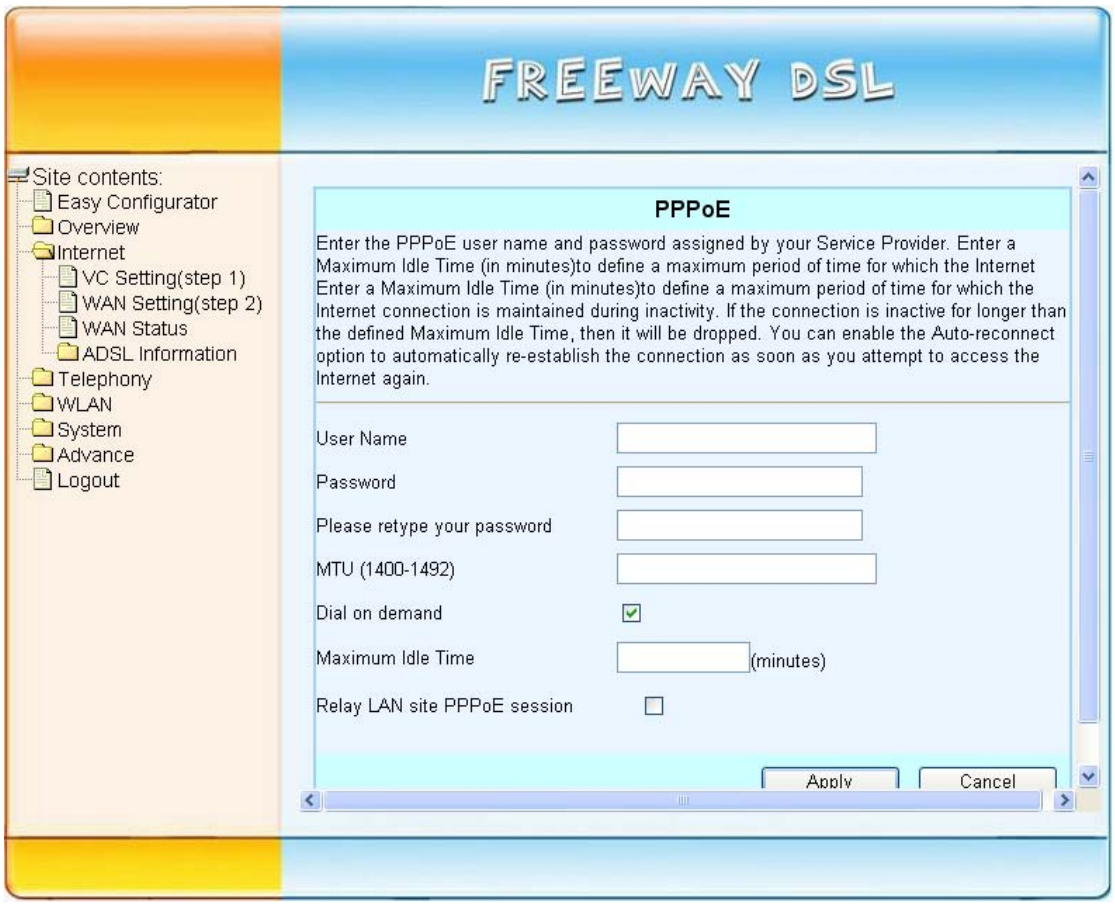
To configure the WAN interface to use a static IP address, select the **Static IP Address** button on the **WAN settings** page and click **Next**. A screen is displayed as shown below.



Field	Description
IP address assigned by your ISP	To enter the IP Address of Freeway DSL.
Subnet Mask	To enter the Subnet Mask of Freeway DSL.
ISP Gateway Address	To enter the Gateway address of the Freeway DSL.
Protocol	Select the supported Protocol: • Classic IP, which is the classical IP over ATM • RFC 2684 Ethernet over ATM • RFC 2684 IP over ATM

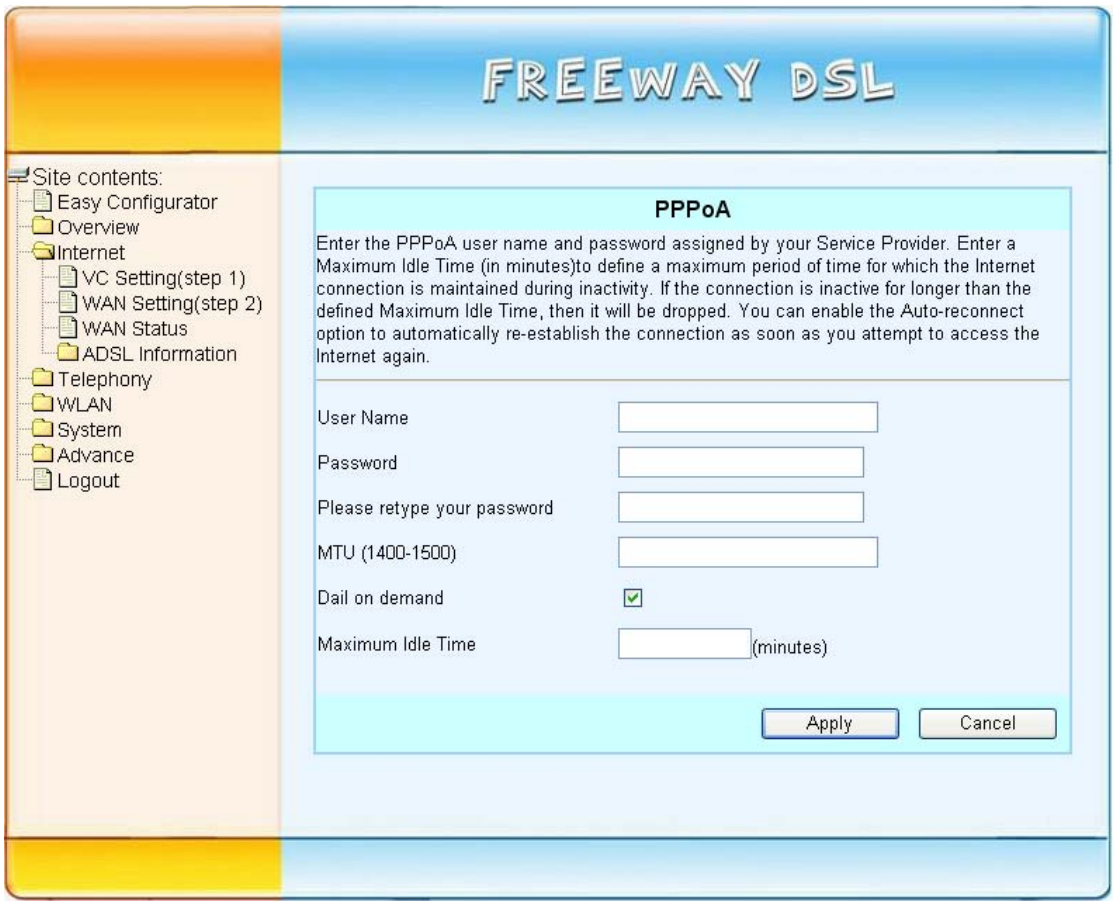
PPPoE

To configure the WAN interface to use PPPoE, select the **PPPoE** button on the **WAN settings** page and click **Next**. A screen is displayed as shown below.


FREEWAY DSL
Site contents:
Easy Configurator
Overview
Internet
VC Setting(step 1)
WAN Setting(step 2)
WAN Status
ADSL Information
Telephony
WLAN
System
Advance
Logout
PPPoE
Enter the PPPoE user name and password assigned by your Service Provider. Enter a Maximum Idle Time (in minutes)to define a maximum period of time for which the Internet Enter a Maximum Idle Time (in minutes)to define a maximum period of time for which the Internet connection is maintained during inactivity. If the connection is inactive for longer than the defined Maximum Idle Time, then it will be dropped. You can enable the Auto-reconnect option to automatically re-establish the connection as soon as you attempt to access the Internet again.
User Name
Password
Please retype your password
MTU (1400-1492)
Dial on demand
Maximum Idle Time
(minutes)
Relay LAN site PPPoE session
Apply
Cancel

Field	Description
User Name	To enter a name to use the PPPoE session.
Password	To enter a password of the login user.
Please retype your password	To enter the password again to reconfirm.
MTU (1400-1492)	To enter the maximum connection units of the PPPoE. The MTU range is 1400 to 1492 bytes.
Dial on Demand	This feature allows to automatically re-connect to the service provider once the connection was lost. Can be enabled or disabled.
Maximum Idle Time	To enter the maximum idle time for disconnecting the connection.
Relay LAN site PPPoE Session	This feature allows to enable/disable a PPPoE relay session.

PPPoA
To configure the WAN interface to use PPPoA, select the **PPPoA** button on the **WAN settings** page and click **Next**. A screen is displayed as shown below.


FREEWAY DSL
Site contents:
Easy Configurator
Overview
Internet
VC Setting(step 1)
WAN Setting(step 2)
WAN Status
ADSL Information
Telephony
WLAN
System
Advance
Logout
PPPoA
Enter the PPPoA user name and password assigned by your Service Provider. Enter a Maximum Idle Time (in minutes)to define a maximum period of time for which the Internet connection is maintained during inactivity. If the connection is inactive for longer than the defined Maximum Idle Time, then it will be dropped. You can enable the Auto-reconnect option to automatically re-establish the connection as soon as you attempt to access the Internet again.
User Name
Password
Please retype your password
MTU (1400-1500)
Dail on demand
Maximum Idle Time
(minutes)
Apply
Cancel

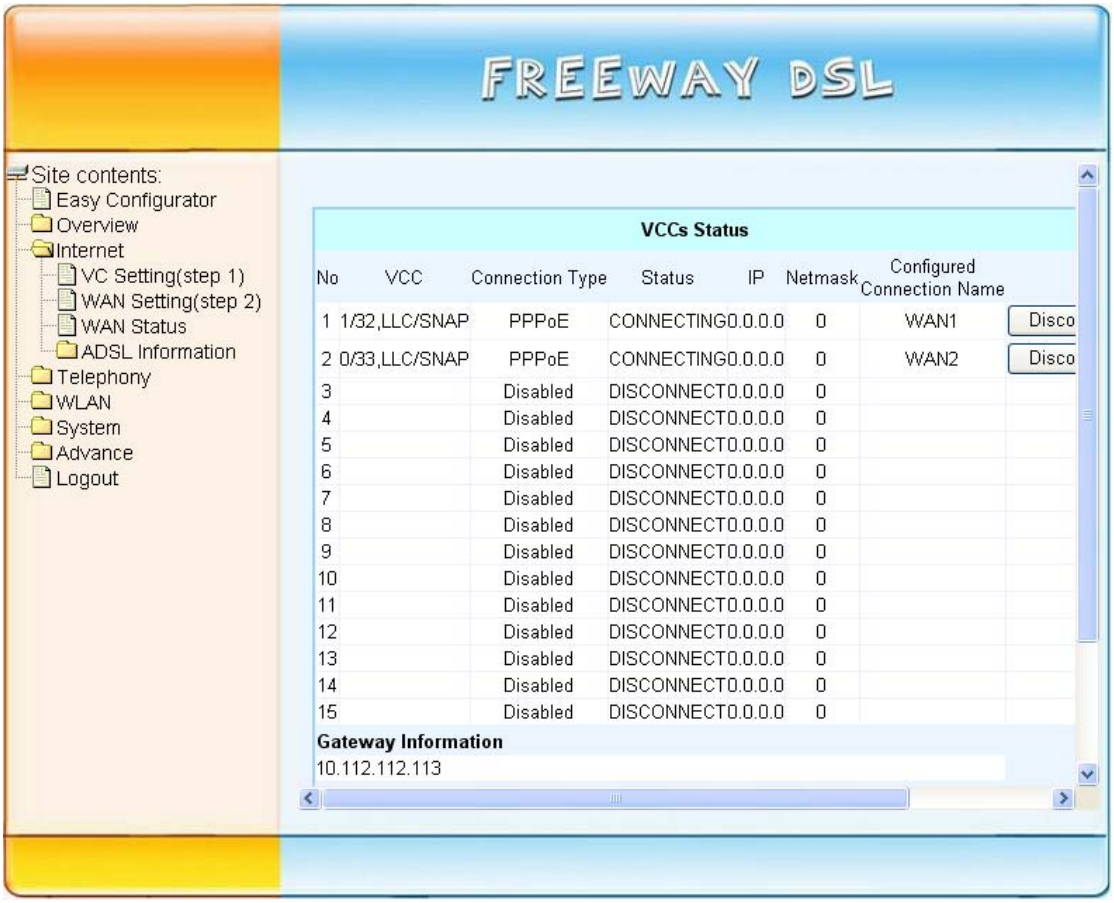
Field	Description
User Name	To enter a name to use the PPPoA session.
Password	To enter a password of the login user.
Please retype your password	To enter the password again to reconfirm.
MTU (1400-1500)	To enter the maximum connection units of the PPPoE. The MTU range is 1400 to 1500 bytes.
Dial on Demand	This feature allows to automatically re-connect to the service provider once the connection was lost. Can be enabled or disabled.

The option Bridge enables the bridge mode, which is a common connection method used for xDSL modem. The entire VCC setting can be disabled using the Disable option.

Bridge
The option Bridge enables the bridge mode, which is a common connection method used for xDSL modem. The entire VCC setting can be disabled using the Disable option. To configure the Bridge settings, select the **Bridge** button on the **WAN settings** page and click **Next**.

4.2.3 WAN Status

This page shows the WAN connection status.



Field	Description
VCC	For the currently configured WAN interface, this gives the VPI/VCI and Encapsulation Method.
Connection Type	The type of the connection mode in which Freeway DSL is configured.
Status	Displays the connection status of the VCC.
IP	Displays the IP address in use.
Netmask	Displays the netmask in use.
Configured Connection Name	Displays the configured connection name
Gateway Information	Provides information about the gateway.
DNS Information	Provides information about the primary and secondary DNS.

The control buttons shown against few VCCs are explained below.

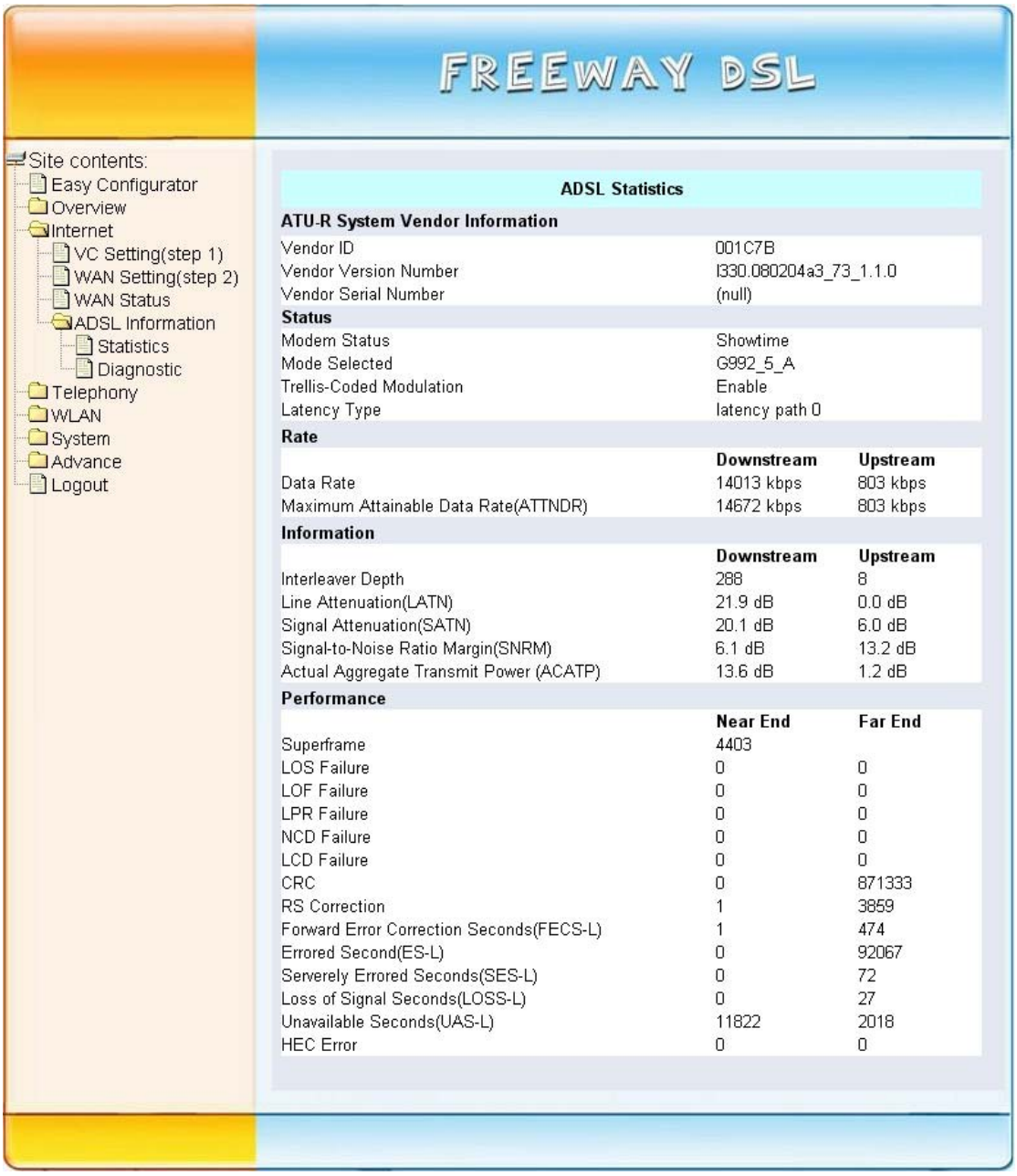
Field	Description
Connect	This button appears only for VCCs of PPPoA and PPPoE type of WAN links. On clicking this button, it tries to establish PPP link.
Disconnect	This button too appears only for VCCs of PPPoA and PPPoE type of WAN links. On clicking this button, it brings down the PPP link.
Release	This button is shown against VCCs of Dynamic IP Address Type. On clicking this button, it releases the DHCP allocated IP address.
Renew	This button too appears for VCCs of Dynamic IP Address Type. On clicking this button, it tries to renew the DHCP lease of allocated IP address.

Note: *The WAN links of other types like Static IP address or Bridge type can not be controlled from this web page.*

4.2.4 ADSL Information

4.2.4.1 Statistics

This page shows the ADSL line statistics information.

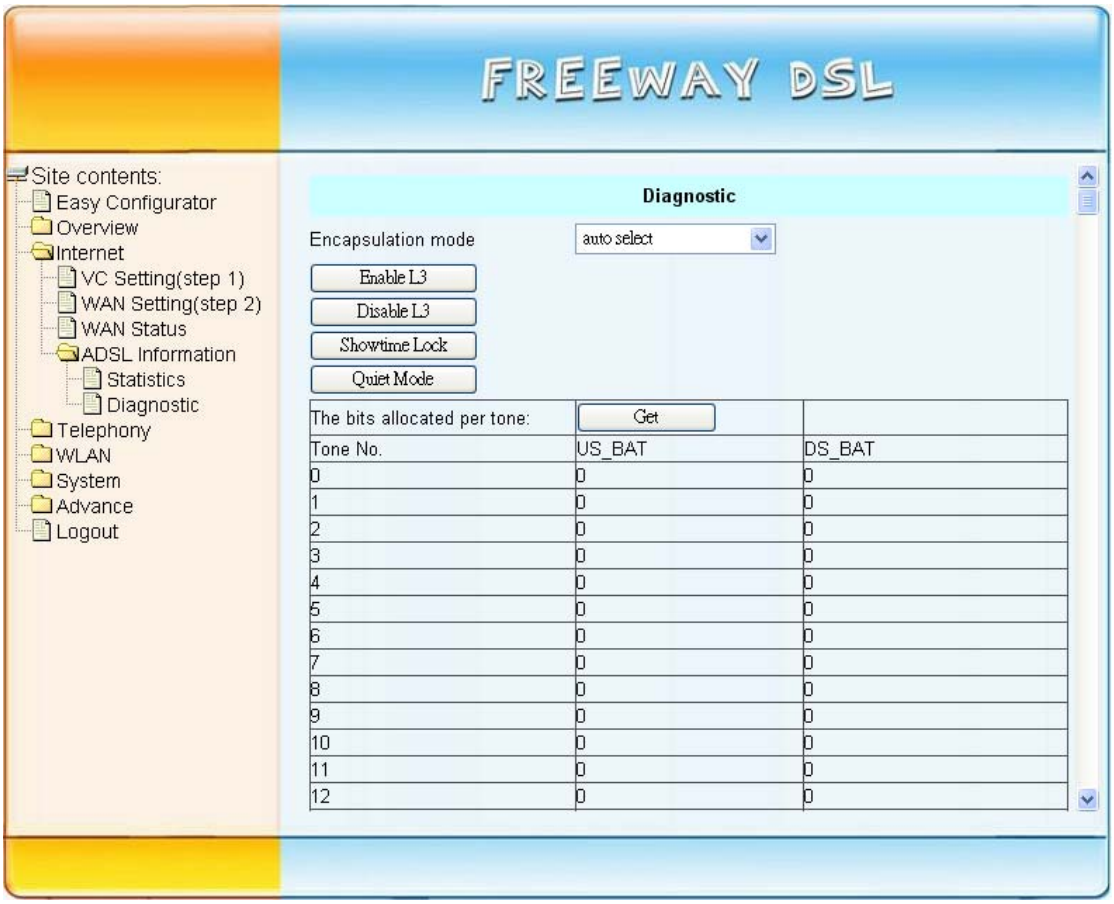


ADSL Statistics

ATU-R System Vendor Information		
Vendor ID	001C7B	
Vendor Version Number	I330.080204a3_73_1.1.0	
Vendor Serial Number	(null)	
Status		
Modem Status	Showtime	
Mode Selected	G992_5_A	
Trellis-Coded Modulation	Enable	
Latency Type	latency path 0	
Rate		
	Downstream	**Upstream**
Data Rate	14013 kbps	803 kbps
Maximum Attainable Data Rate(ATTNDR)	14672 kbps	803 kbps
Information		
	Downstream	**Upstream**
Interleaver Depth	288	8
Line Attenuation(LATN)	21.9 dB	0.0 dB
Signal Attenuation(SATN)	20.1 dB	6.0 dB
Signal-to-Noise Ratio Margin(SNRM)	6.1 dB	13.2 dB
Actual Aggregate Transmit Power (ACATP)	13.6 dB	1.2 dB
Performance		
	Near End	**Far End**
Superframe	4403	
LOS Failure	0	0
LOF Failure	0	0
LPR Failure	0	0
NCD Failure	0	0
LCD Failure	0	0
CRC	0	871333
RS Correction	1	3859
Forward Error Correction Seconds(FECS-L)	1	474
Errored Second(ES-L)	0	92067
Serverely Errored Seconds(SES-L)	0	72
Loss of Signal Seconds(LOSS-L)	0	27
Unavailable Seconds(UAS-L)	11822	2018
HEC Error	0	0

4.2.4.2 Diagnostic

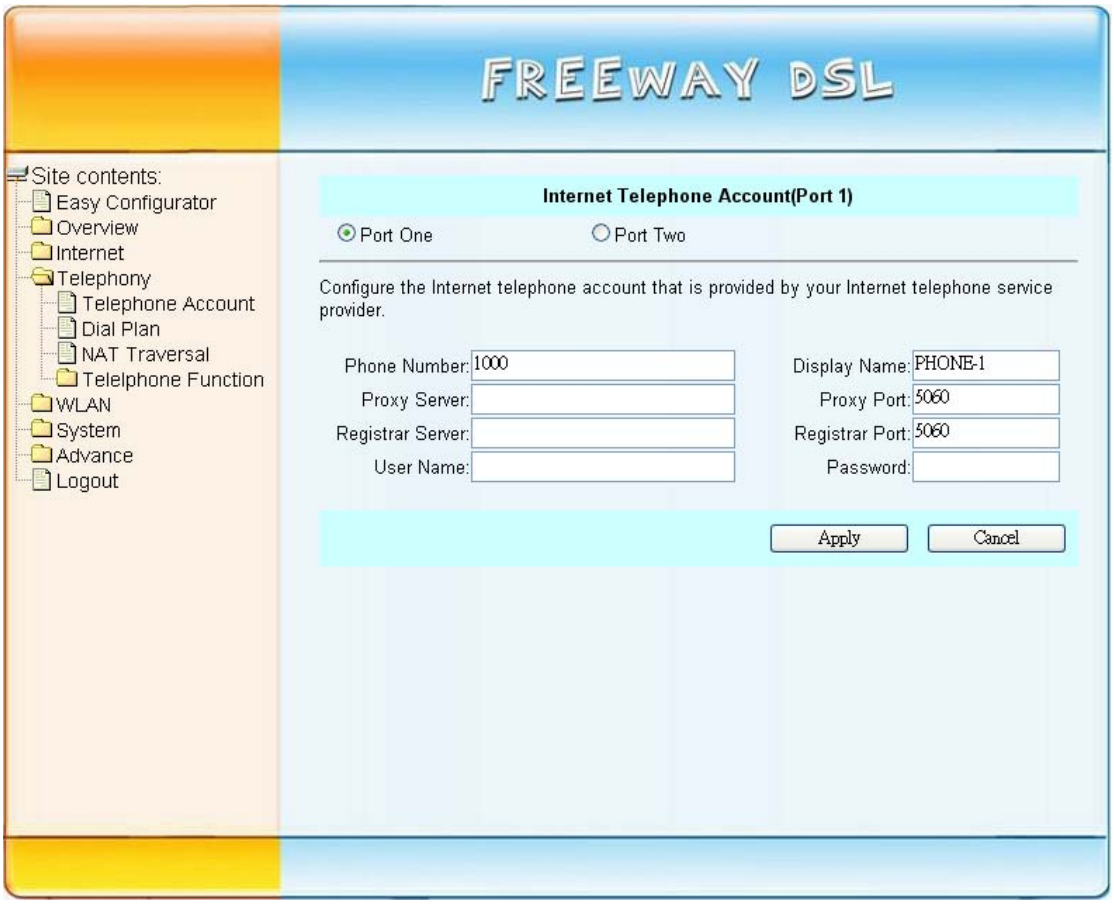
This page shows the ADSL tone diagnostic information. You will not typically need to view this data, but you may find it helpful when working with your ISP to diagnose network and Internet data transmission problems.



4.3 Telephony

4.3.1 Telephone Account

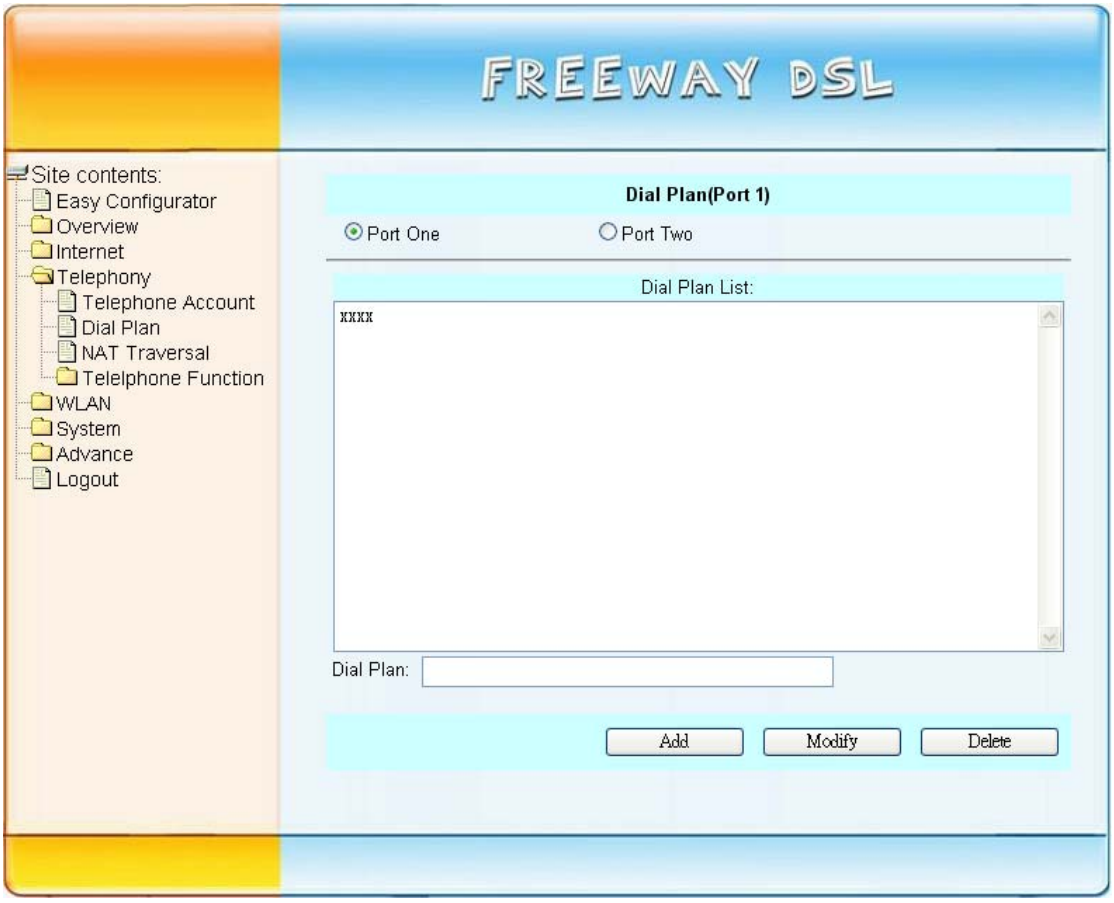
This page allows you to configure the Internet telephone account. Your ITSP (Internet telephone service provider) should provide you with the sufficient information.



Field	Description
Phone Number	Configure the number for this account.
Display Name	Configure the display name for this account.
Proxy Server	Configure the proxy server for this account.
Proxy Port	Configure the proxy port for this account. Default is **5060**.
Registrar Server	Configure the register server for this account.
Registrar Port	Configure the register port for this account. Default is **5060**.
User Name	Configure the user name of this account for authentication.
Password	Configure the user password of this account for authentication.

4.3.2 Dial Plan

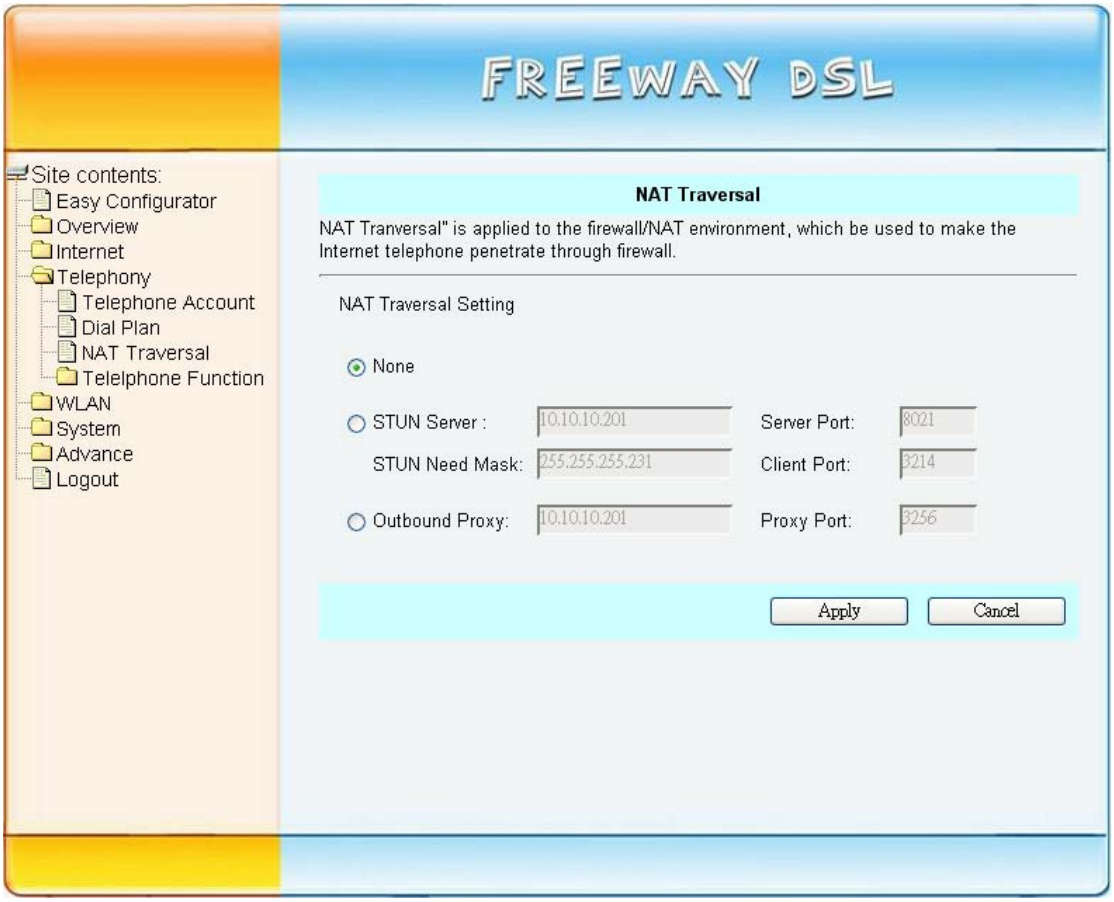
This page allows you to configure the dial plan for the Freeway DSL.



Field	Description
Dial Plan List	Shows the dial plan you configured in the dial plan field
Dial Plan	To enter the dial plan settings.

4.3.3 NAT Traversal

STUN (Simple Traversal of UDP through NATs (Network Address Translation)) is a protocol for assisting devices behind a NAT firewall or router with their packet routing. This page allows you to configure the NAT traversal for the Internet telephone to penetrate through firewall.



Field	Description
None	Select the radio to disable STUN Traversal function.
STUN Server	Enter the IP address of STUN server.
Server Port	Enter the port number to be used for the STUN server.
STUN Need Mask	Enter the subnet mask of STUN server.
Client Port	Enter the port number to be used for the STUN client (e.g. Freeway DSL).
Outbound Proxy	Enter the IP address of outbound proxy server.
Proxy Port	Enter the port number to be used for the outbound proxy server.

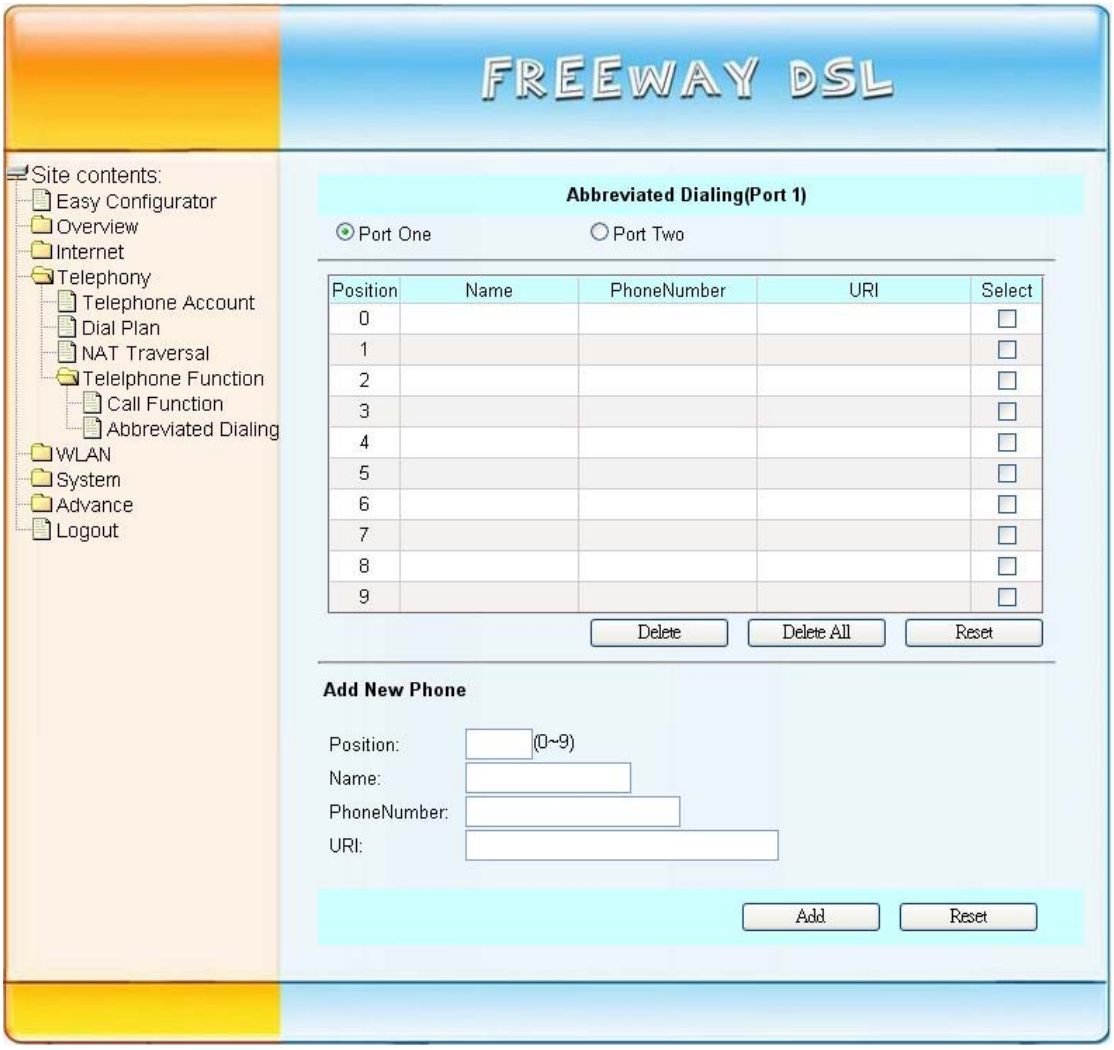
4.3.4 Telephone Function

4.3.4.1 Call Function

This page allows you to select the telephone features you want to apply to your telephone account.

4.3.4.2 Abbreviated Dialing

This page allows you to configure the abbreviated dialing for Port 1and 2. Abbreviated dialing allows stored numbers to be called by dialing a short 1 or 2 digit code from your home phone. You can set up to 20 entries totally in Port 1 and Port 2 pages. When user A calls B, if B's name is in the abbreviated dialing list, B's name will be shown on the phone. If not, only B's phone number will be displayed.

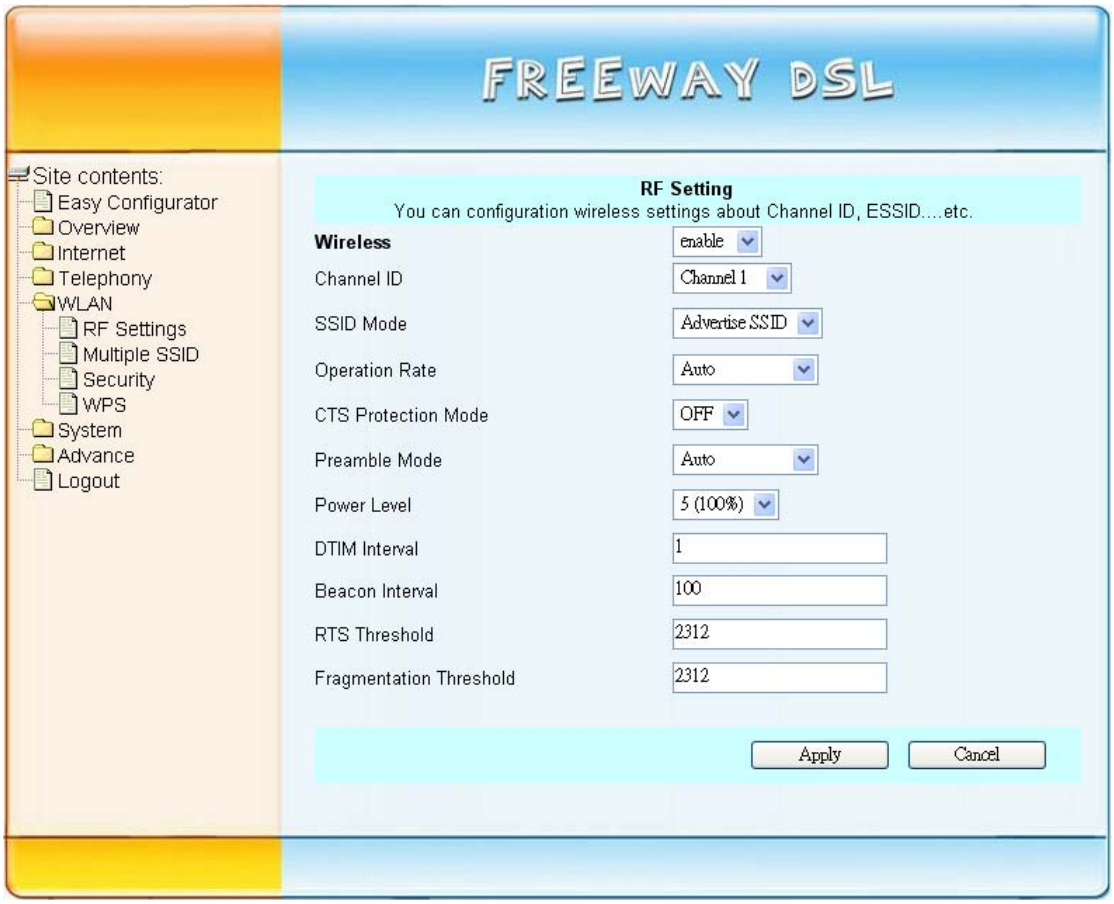


Field	Description
Position	To enter the location from 0 to 9 to store the entry.
Name	To enter the name for this phone number.
PhoneNumber	To enter the phone number. It is recommended that using the digits to be the name and it could be also used as the speed-dial numbers.
URI	Input the Line Number or IP address.

4.4 WLAN

4.4.1 RF Settings (Wireless Basic Settings)

This page contains all of the wireless basic settings. Most users will be able to configure the wireless connection and get it working properly using the setting on this screen.



Field	Description
Wireless	Select to enable or disable wireless.
Channel ID	Select the operation channel for the wireless.
SSID Mode	A Service Set Identifier (SSID) value that controls access to a wireless network. This field allow to: • Advertise SSID: The client can scan/discover the SSID. • Hide SSID: The SSID is hidden and only if you know the SSID you can connect to Freeway DSL.
Operation Rate	Allows to specify the operation mode to be: • Auto • 802.11B rate only • 802.11G rate only
CTS Protection Mode	If CTS (Clear-To-Send) Protection Mode is set to ON. The AP will automatically use CTS Protection Mode when the Wireless-G products are experiencing severe problems and are not able to transmit to the AP in an environment with heavy 802.11b traffic. This function boosts the AP's ability to catch all Wireless-G transmissions but will severely decrease the performance. If you do not want to use CTS Protection Mode at all, select OFF (default).
Preamble Mode	Allows to specify the preamble mode to: • Auto • Long Preamble • Short Preamble

Power Level	Select the output power of wireless radio to be 20%, 40%, 60%, 80% or 100%. Unless you are using this Freeway DSL in a really wide space, you may not have to set radio power to 100%. The wider coverage the more security risk (malicious or unknown users in distance will be able to reach the Freeway DSL).
DTIM Interval	Specifies the interval of the Delivery Traffic Indication Message (DTIM). A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. Its clients hear the beacons and awaken to receive the broadcast and multicast messages.
Beacon Interval	Specifies the interval between beacon packets, which IEEE 802.11 systems use to synchronize clients. Beacon packets contain timing and other information that is broadcast over the airwaves. Any station that receives the beacon packet can then synchronize with the system broadcasting beacons. The default value of the beacon period is 100 milliseconds.
RTS Threshold	Specifies the data packet size beyond which the low-level RF protocol invokes RTS/CTS flow control. A small value causes RTS packets to be sent more often, which consumes more of the available bandwidth and reduces the throughput of other network packets. However, small values help the system recover from interference or collisions, which can occur in environments with obstructions or metallic surfaces that create complex multipath signals. Should you encounter inconsistent data flow, only minor reduction of the default value, 2312, is recommended. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The Router sends Request to Send (RTS) frames to a particular receiving station and negotiates the sending of a data frame. After receiving an RTS, the wireless station responds with a Clear to Send (CTS) frame to acknowledge the right to begin transmission.
Fragment Threshold	Defines the largest RF packet that the client adapter sends without splitting the packet into two or more smaller fragments. If a single fragment experiences interference during transmission, only that fragment must be resent. Fragmentation generally reduces throughput because the packet overhead for each fragment consumes a higher portion of the RF bandwidth.

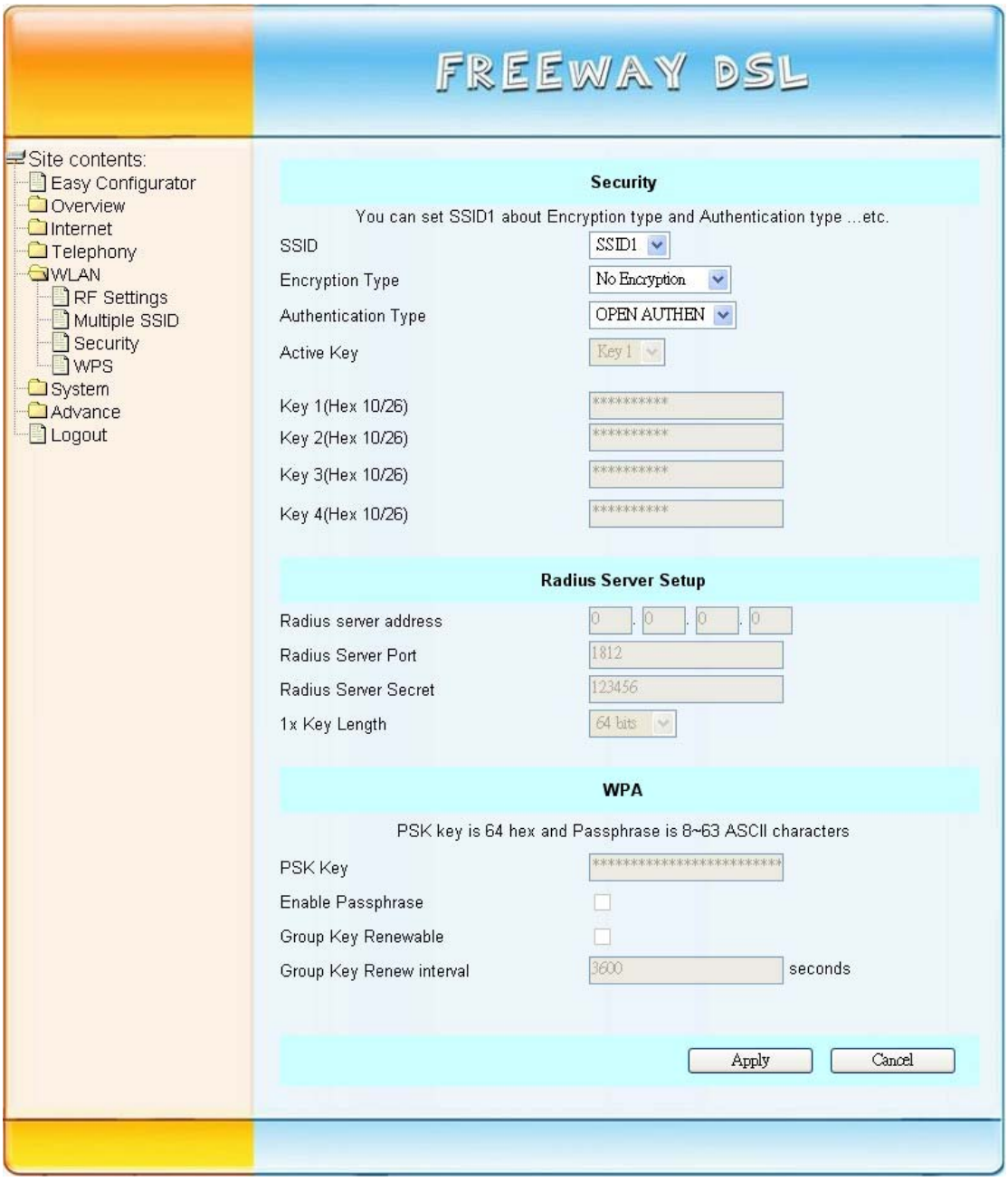
4.4.2 Multiple SSID

This page allows you to configure multiple SSID for Freeway DSL.

Field	Description
SSID	Select the SSID and configure its name in the SSID Name field.
Enable SSID	Check to enable this SSID.
SSID Name	To enter the Name for the selected SSID.

4.4.3 Security

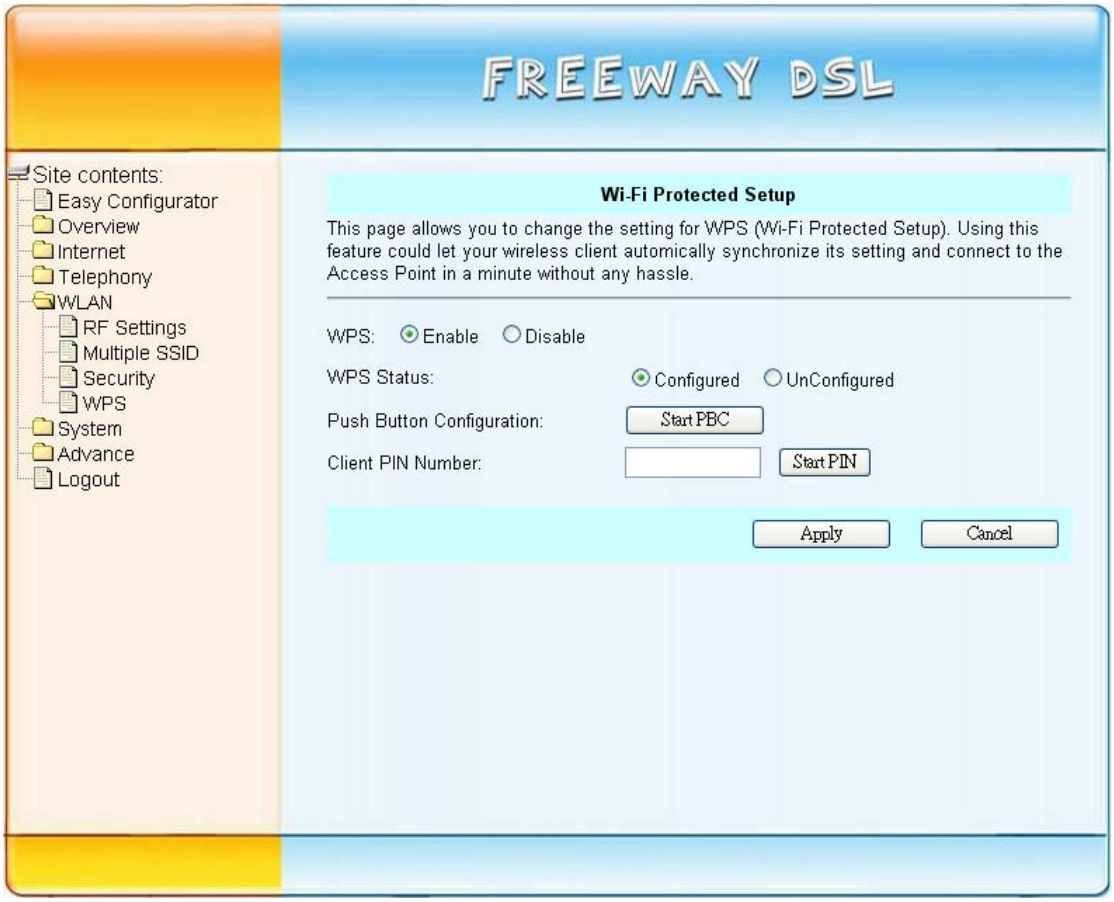
This page allows advanced users who have sufficient knowledge of wireless LAN to configure advanced settings for the wireless connection. The default settings shall not be changed unless you know exactly what will happen for the changes you made to your Freeway DSL. This screen allows you to setup the wireless security. Enable WEP or WPA by configuring encryption keys can prevent unauthorized access to your WLAN.



Field	Description
SSID	Select the SSID and configure the necessary security.
Encryption Type	Select the security type you need. To secure your wireless network, it's strongly recommended to enable this feature. • **No Encryption** • **WEP 64**: (10 digits) Make sure that all wireless devices on your network are using the same encryption level and key. • **WEP 128**: (26 digits) Make sure that all wireless devices on your network are using the same encryption level and key. • **Standard 802.1x**: Select to use 802.1x encryption. • **WPA (TKIP):** WPA uses Temporal Key Integrity Protocol (TKIP) for data encryption. TKIP utilized a stronger encryption method and incorporates Message Integrity Code (MIC) to provide protection against hackers. • **WPA2 (AES)**: WPA2 uses Advanced Encryption Standard (AES) for data encryption. AES utilized a symmetric 128bit block data encryption. • **TKIP/AES**: Supports both WPA (TKIP) and WPA2 (AES) for data encryption.
Authentication Type	Used to specify the WLAN authentication type which can be: • **OPEN AUTHEN**: Enables your client adapter, regardless of its WEP settings, to attempt to authenticate and communicate with an access point. • **Radius Server**: It uses an external RADIUS server to perform user authentication. To use WPA RADIUS, enter the IP address of the RADIUS server, the RADIUS port (default is 1812) and the shared secret from the RADIUS server. • **Pre-Share Key**: Pre-Shared Key authentication is based on a shared secret that is known only by the parties involved.
Active Key	Used to specify the active key to be used.
Key 1 ~4 (Hex 10/26)	Specifies the value of key 1 ~ 4.
Radius Server Setup	
NAS Identifier	Specifies the Radius server identifier.
Radius Server address	Configures the IP Address of the Radius server.
Radius Server Port	Configures the Radius server Port number.
Radius Server Secret	Configures the Radius server secret access code.
1x Key Length	Configures the key length.
WPA	
PSK Key	Specifies the PSK key.
Enable Passphrase	Enables/Disables the use of the passphrase.
Group Key Renewable	Enables/Disables if the Key renewable.
Group Key renew Interval	Configure the Key renew interval time (period).

4.4.4 WPS

This page is used to configure the settings for WPS (Wi-Fi Protected Setup). It uses a push-button or a 4- or 8-digit personal identification number (PIN) to simplify the secure network setup. The PIN can be generated by software or preprogrammed into a client device and printed on an included card. With WPS, Freeway DSL can automatically set the SSID or network name as part of the setup process and provide strong encryption keys to client devices. You do not need to configure SSID, wireless security setting, etc., in the client software. In order to use WPS, the wireless client software must also support WPS.

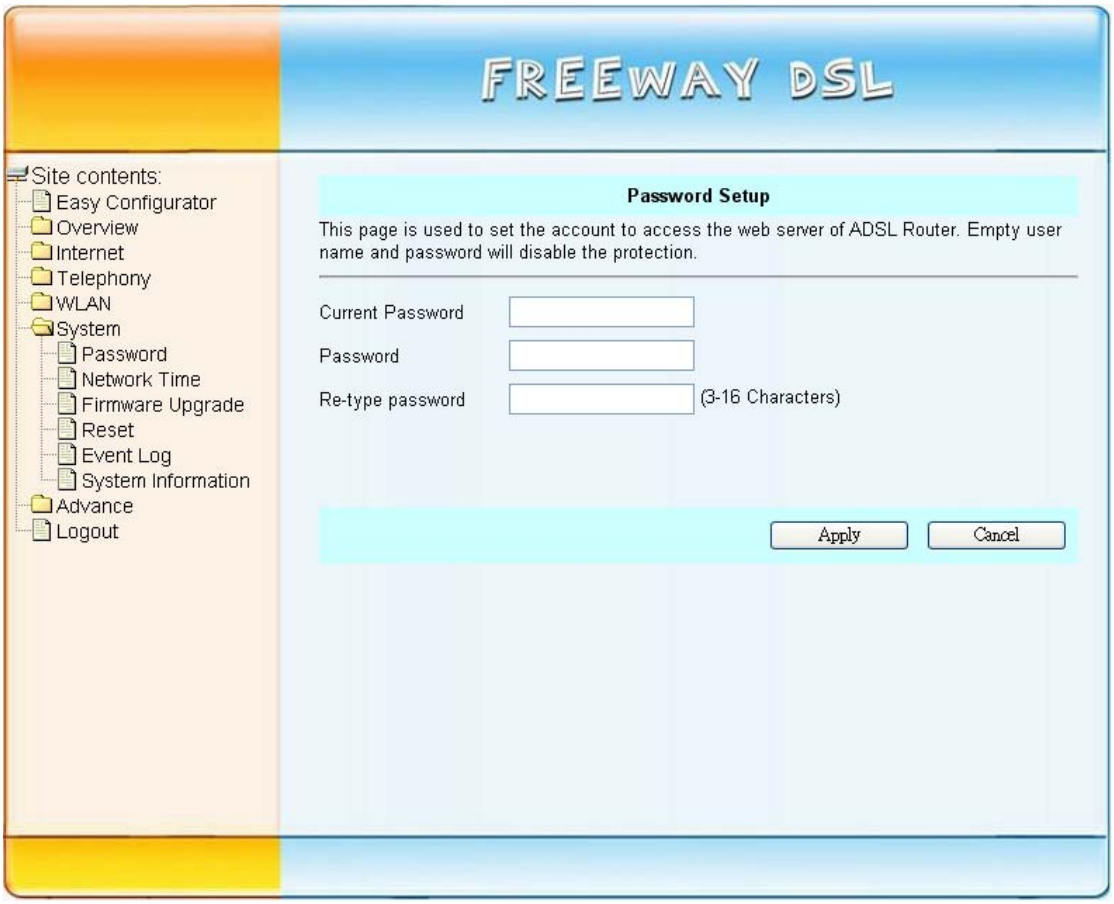


Field	Description
WPS	Select to enable/disable WPS function.
WPS Status	If the wireless security (encryption) function of the Freeway DSL is properly set, you will see "Configured" radio button in action mode, otherwise, "UnConfigured" is in action mode.
Start PBC	Click this button to start PBC (Push-Button Configuration) setup procedure. The **WPS** LED on the Freeway DSL will blink slowly for 2 minutes when the Freeway DSL is waiting for incoming WPS request.
Client PIN Number	Enter the PIN number of the wireless client you wish to connect.
Start PIN	Click this button to start PIN setup procedure. The **WPS** LED on the Freeway DSL will blink slowly for 2 minutes when the Freeway DSL is waiting for incoming WPS request.

4.5 System

4.5.1 Password

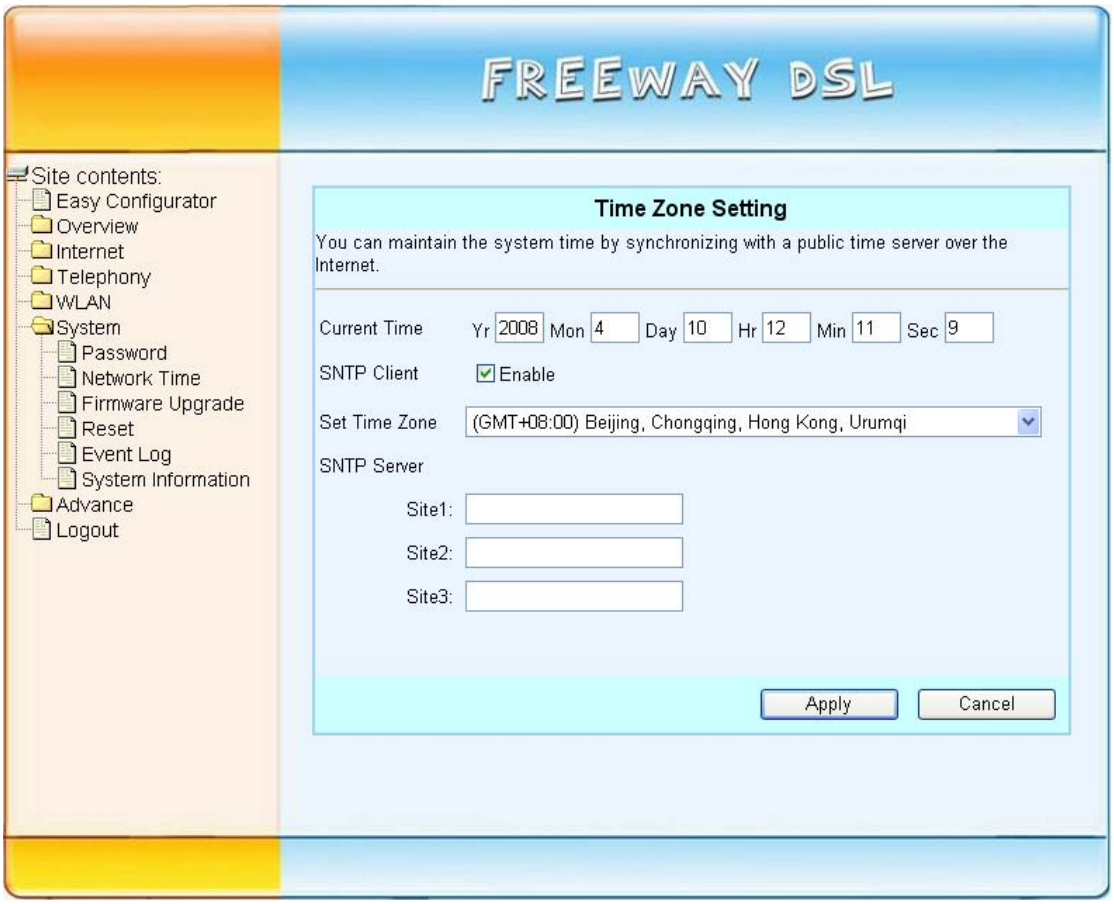
The first time you log into the system with default password. This page allows you to change the password for administrator.



Field	Description
Current Password	Enter the old password in this field.
Password	Enter the new password in this field.
Re-type Password	Enter the new password in this field to confirm the password.

4.5.2 Network Time

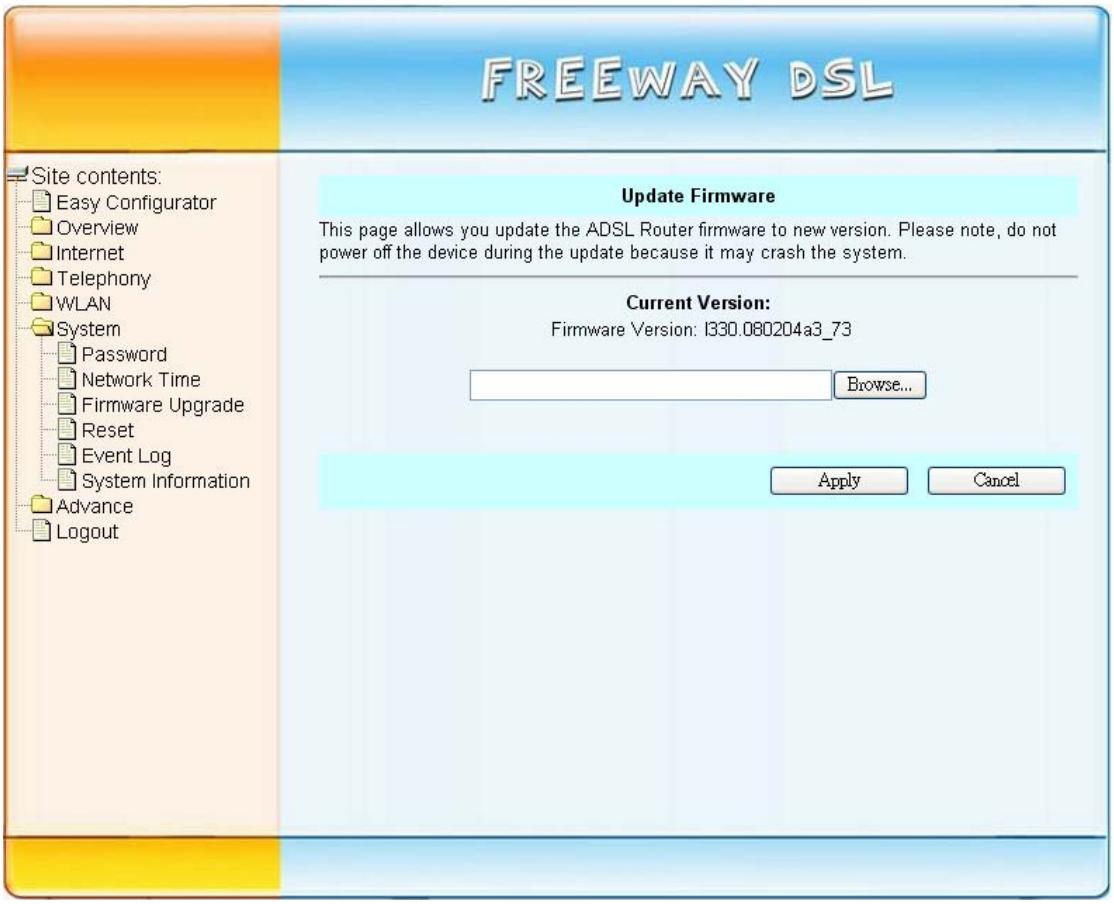
Simple Network Timing Protocol (SNTP) is a protocol used to synchronize the system time to the public SNTP servers. The Freeway DSL supports SNTP client functionality in compliance with IETF RFC2030. This page allows you to manually configure the time and select Time Zone. Also, you can enable SNTP client update function and configure the SNTP server to let the Freeway DSL synchronize with the public SNTP servers.



Field	Description
Current Time	The current time of the specified time zone. You can set the current time by yourself or configured by SNTP.
SNTP Client	To enable/disable SNTP client function. You must enable SNTP client to allow updating system clock.
Set Time Zone	Select The time zone in which the Freeway DSL resides.
Enable SNTP client update	Enable the SNTP client to update the system clock.
SNTP Server	Enter the network time server for the Freeway DSL to synchronize with.

4.5.3 Firmware Update

The system software used by this Freeway DSL is called "firmware". This page allows you to upgrade the firmware to newer version.



To upgrade firmware, please follow the following instructions:

1. Click the **Browse** button to select the firmware file.
2. Confirm your selection.
3. Click the **Apply** button to start upgrading.

IMPORTANT! Do NOT power off the Freeway DSL or press the Reset button while this procedure is in progress.

4.5.4 Reset

This page allows you to reset the Freeway DSL.

FREEWAY DSL
Site contents:
Easy Configurator
Overview
Internet
Telephony
WLAN
System
Password
Network Time
Firmware Upgrade
Reset
Event Log
System Information
Advance
Logout
Reset ADSLGW
In the event that the ADSLGW stops responding correctly or in some way stops functioning, you can perform a reset. Your settings will not be changed. To perform the reset, click on the "Reset" button below. You will be asked to confirm your decision. The reset will be complete when the power light stops blinking.
Reset
FactoryReset

Field	Description
Reset	Reboot the device while still remain its current settings
FactoryReset	Reset the device to default settings will erase all the current settings and you need to re-configure the settings after reboot.

IMPORTANT! Do NOT power off the Freeway DSL or press the Reset button while this procedure is in progress.

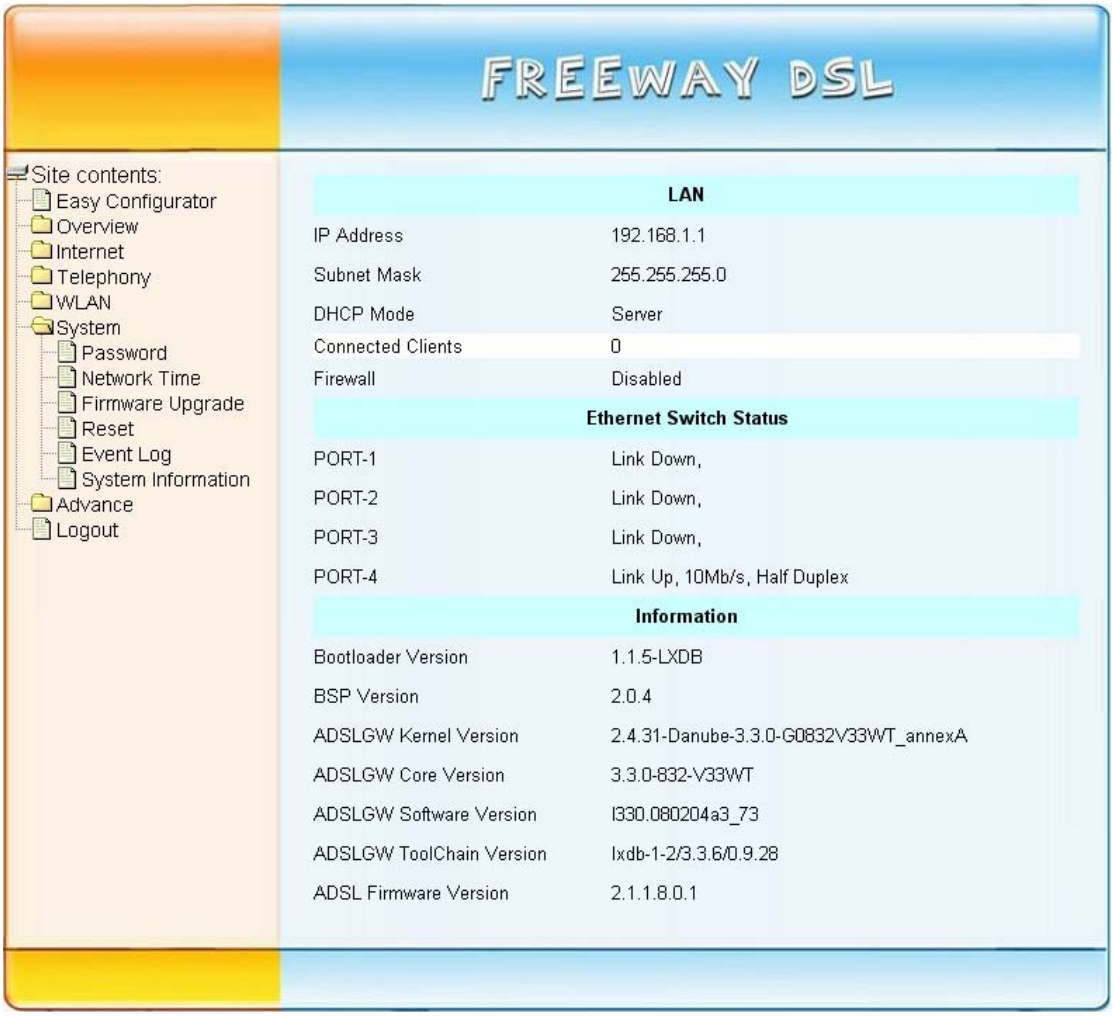
4.5.5 Event Log

This page shows the logged information including any attempts that have been made to access your network.

Field	Description
Download	To download the log file to the computer.
Clear	Clear the logs in this page.
Refresh	To retrieve system event and update the log file.

4.5.6 System Information

This page shows the LAN, Ethernet ports and device information.

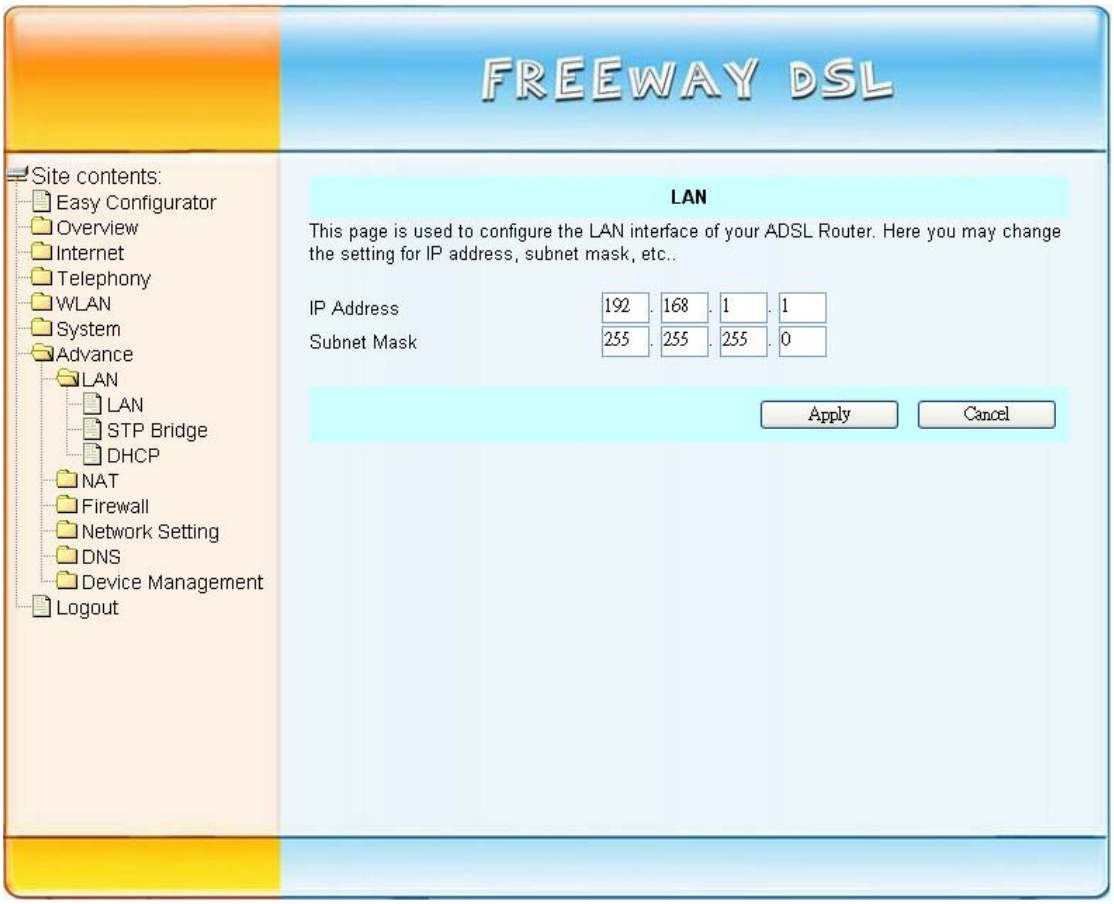


4.6 Advance

4.6.1 LAN

4.6.1.1 LAN

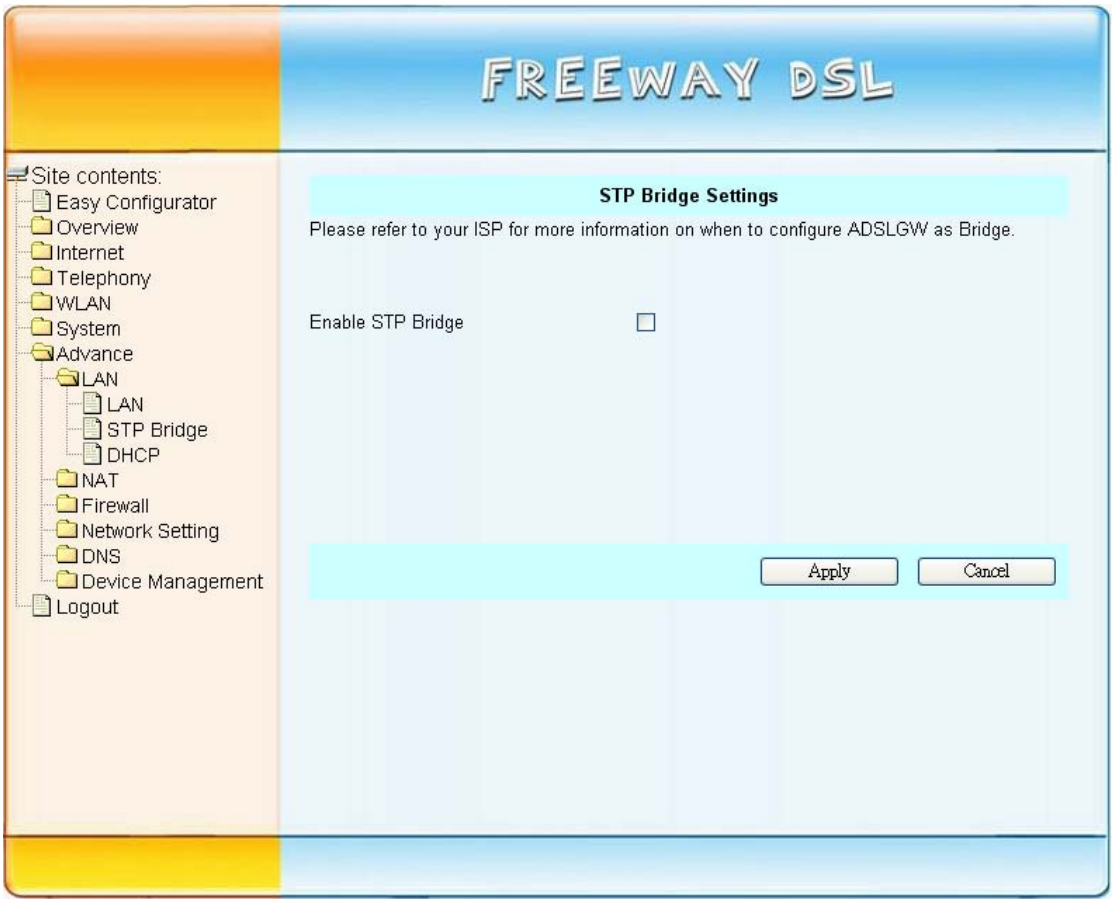
This page shows the current setting of LAN interface. You can set IP address and subnet mask for LAN interface in this page.



Field	Description
IP Address	Enter the IP address of Freeway DSL.
Subnet Mask	Enter the subnet mask for this network.

4.6.1.2 STP Bridge

This page allows you to enable STP Bridge feature to configure Freeway DSL as bridge mode.

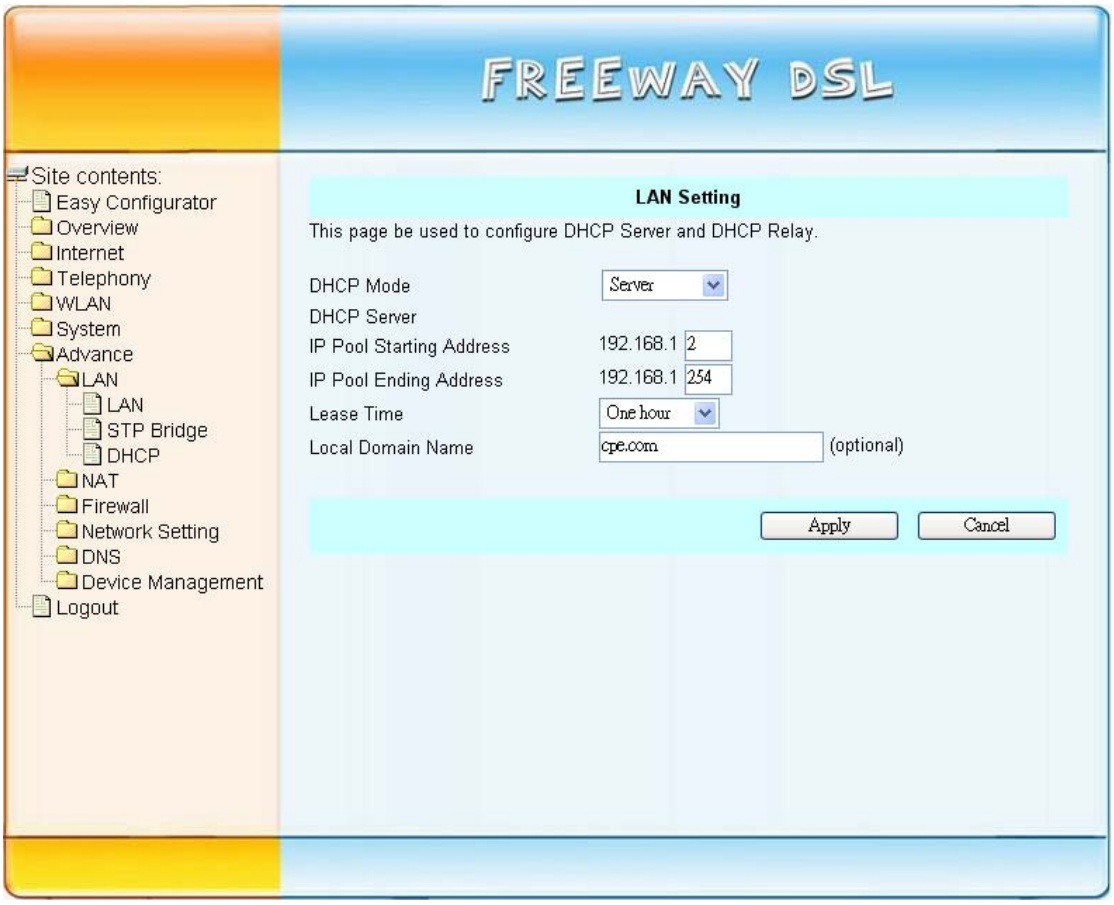


Field	Description
Enable STP Bridge	Check to enable STP bridge feature.

4.6.1.3 DHCP

The Freeway DSL supports the Dynamic Host Configuration Protocol (DHCP). This page is used to configure the Freeway DSL to be a DHCP server or a DHCP Relay agent.

DHCP Server Configuration
By default, the Freeway DSL is configured as a DHCP server, with a predefined IP address pool from 192.168.1.2 to 192.168.1.254 (subnet mask 255.255.255.0).

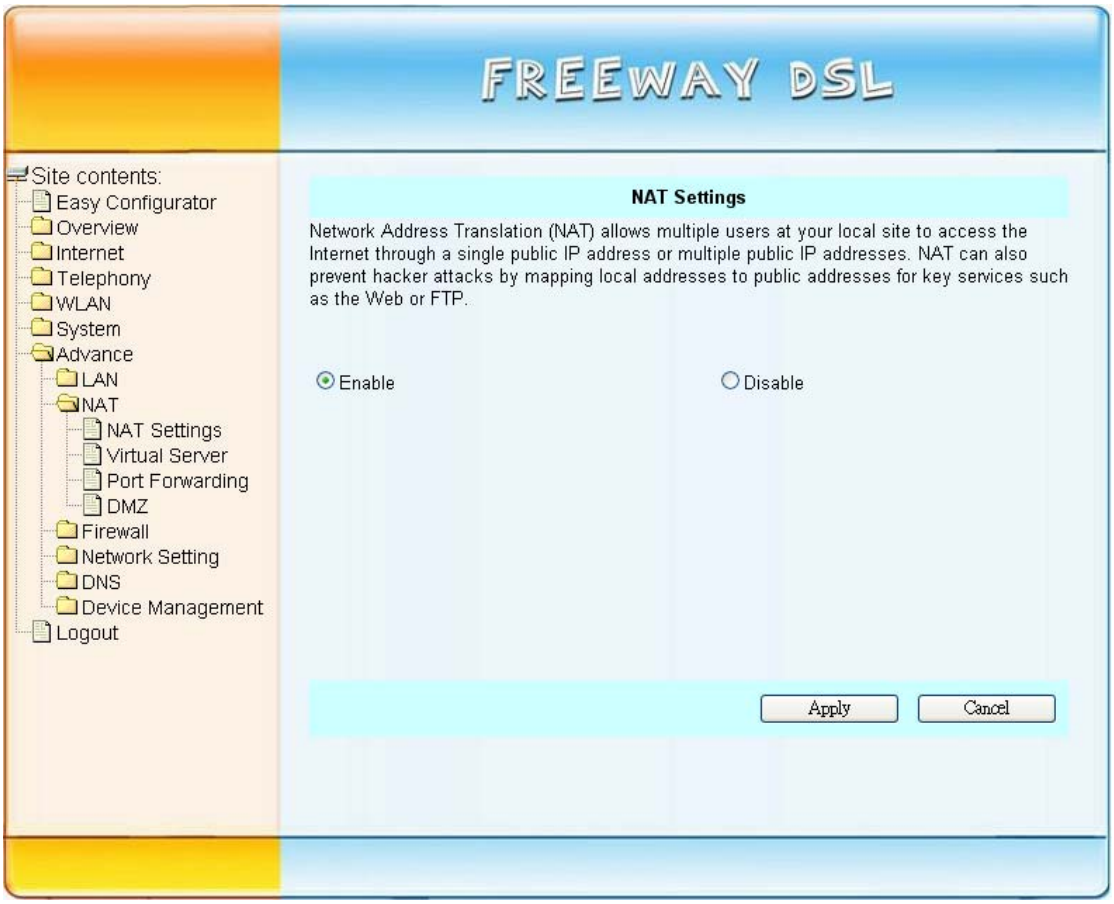


Field	Description
DHCP Mode	To select DHCP mode to be Disable, Server or Relay Agent.
DHCP Server	
IP Pool Starting Address	To enter the starting IP Address of the DHCP server pool.
IP Pool Ending Address	To enter the ending IP Address of the DHCP server pool.
Lease Time	To select the lease time of the DHCP server.
Local Domain Name (optional)	To enter the Domain Name of the DHCP server.
DHCP Relay Agent	
DHCP Relay	Select a WAN interface for the relay.
DHCP Server IP	IP address of the DHCP server on the interface showed, to which the DHCP requests are relayed.

4.6.2 NAT

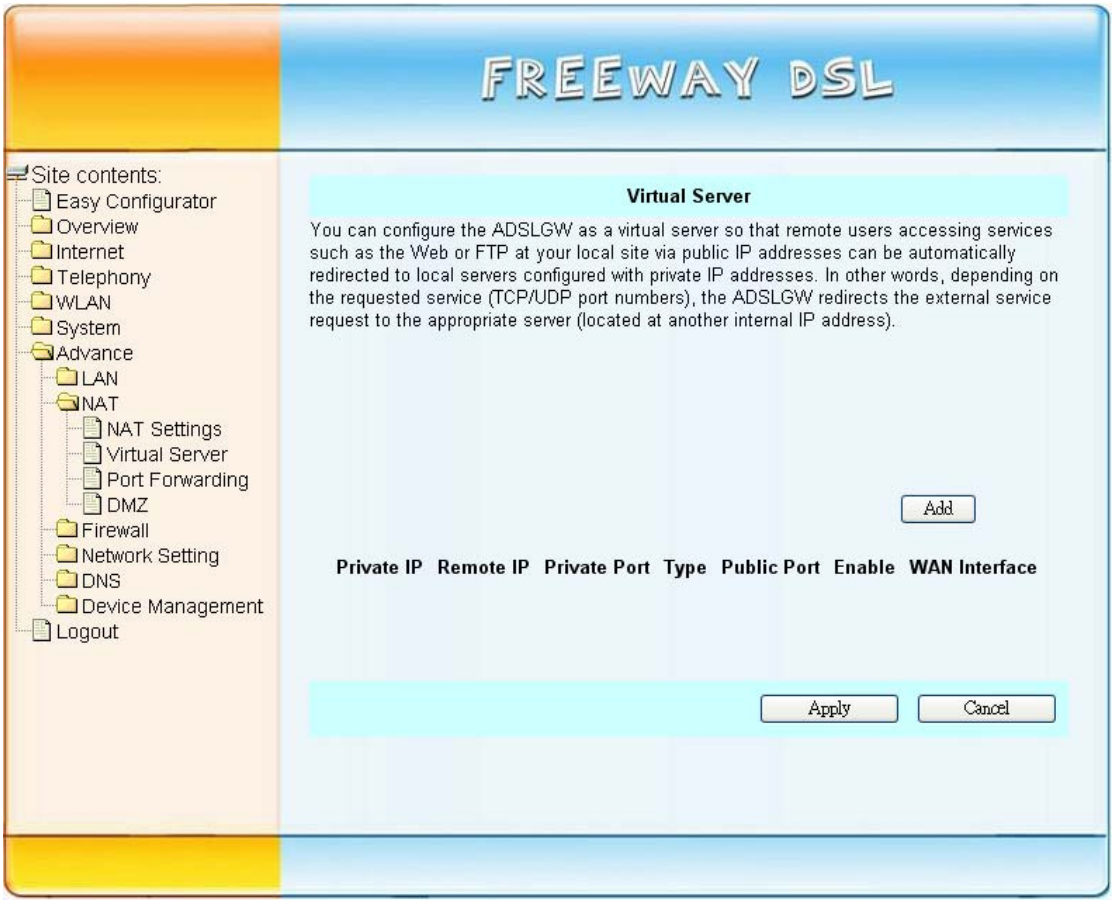
4.6.2.1 NAT Settings

This page allows you to enable NAT feature.



4.6.2.2 Virtual Server

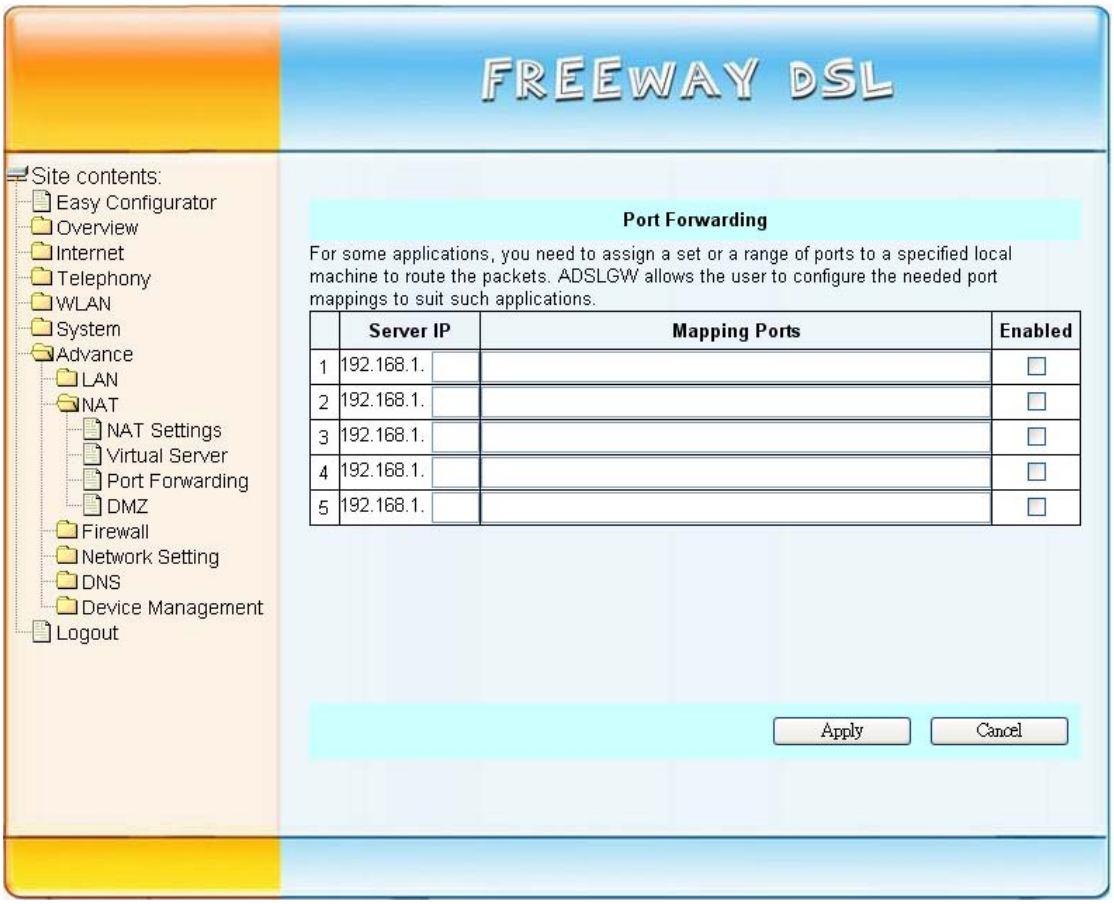
This page allows you to configure the Freeway DSL as a virtual server. This enables remote users to access services at your local site from the Internet.



Field	Description
Private IP	To enter a private IP address of specified entry.
Remote IP	To enter a remote IP address of specified entry.
Private Port	To enter a private Port number of the specified entry.
Type	To select virtual server protocol type of the specified entry.
Public Port	To enter a public port number of the internet user to access the virtual server.
Enabled	To enable the specified entry of the virtual server.
WAN Interface	To select the WAN interface to be used for the virtual server.

4.6.2.3 Port Forwarding

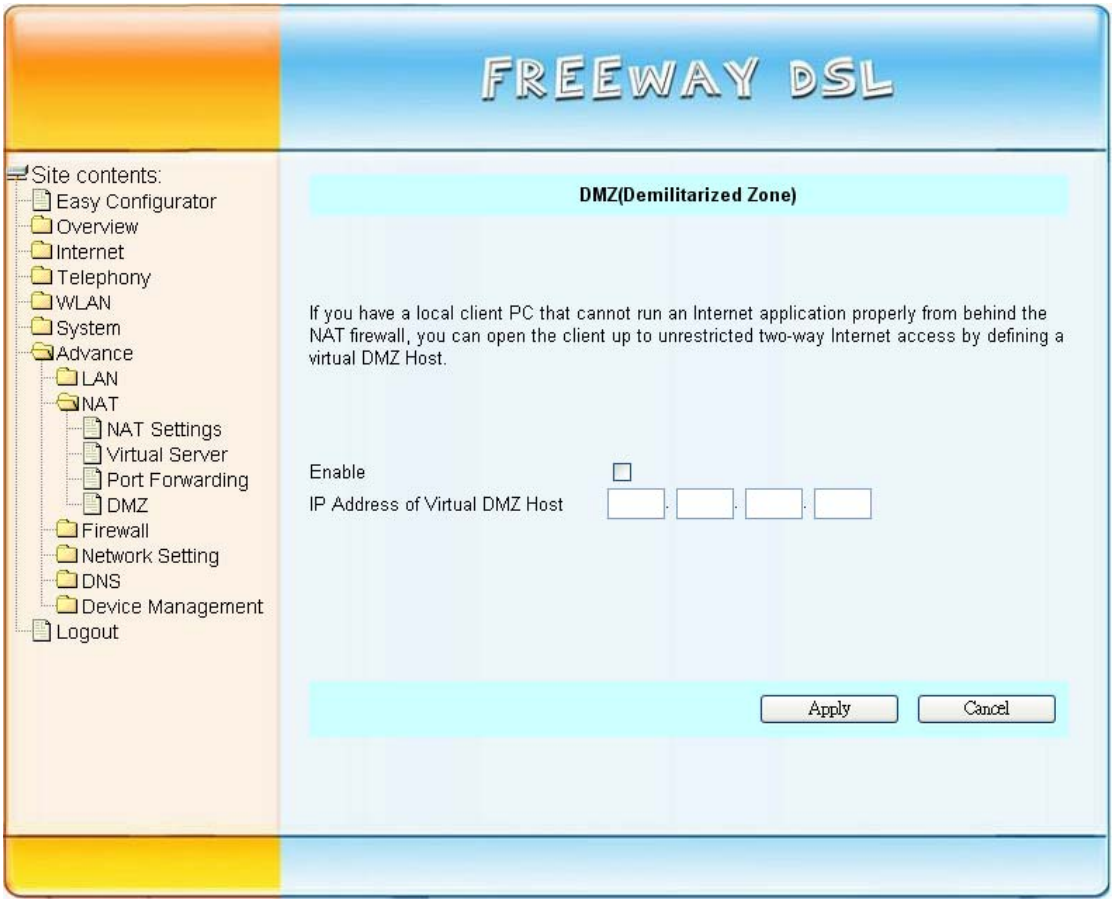
This page allows you to configure port forwarding rules. Add a Port Forwarding entry will create a tunnel through your firewall so that the computers on the Internet can communicate to one of the computers on your LAN on a single port.



Field	Description
Server IP	To enter the local IP address to route the packets.
Mapping Ports	To enter the port number for specific applications.

4.6.2.4 DMZ (DeMilitarized Zsone)

This page allows you to configure a local PC to be exposed on the Internet for unrestricted two-way Internet access.

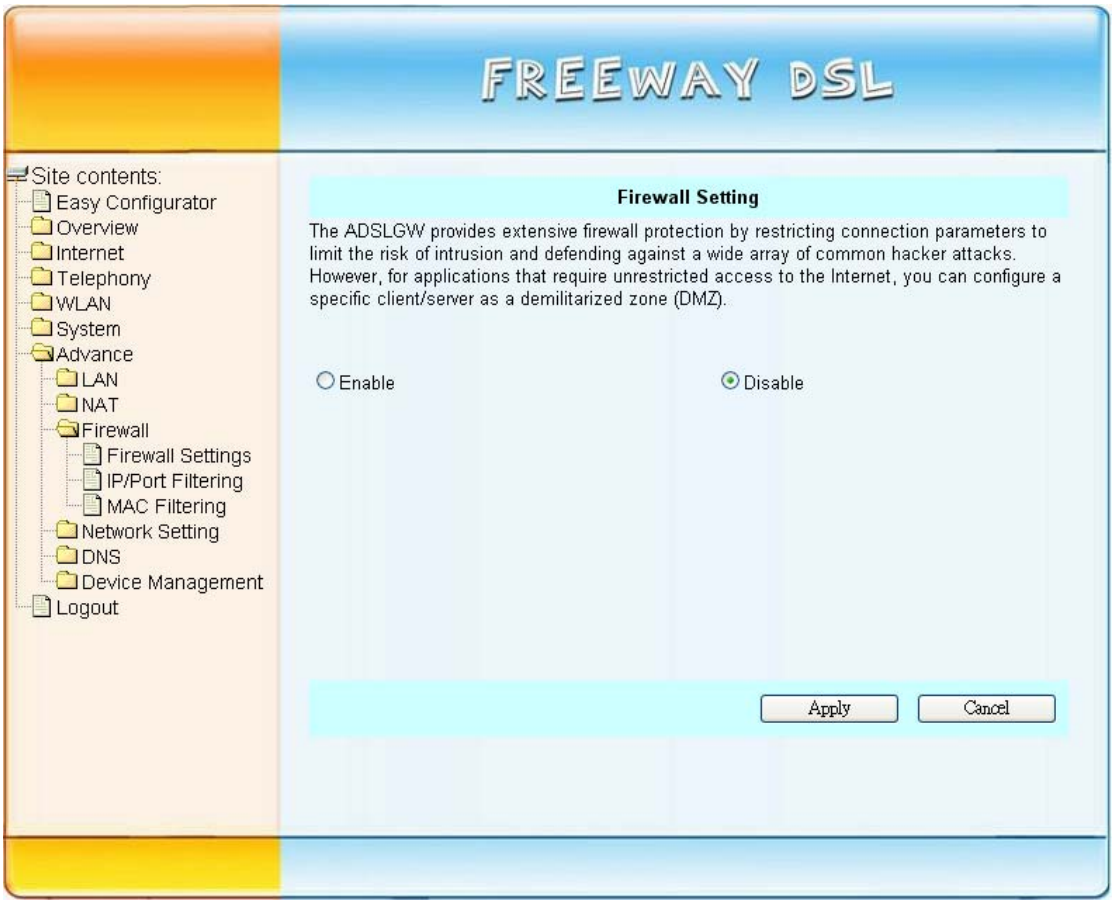


Field	Description
Enable	To enable/disable DMZ function.
IP Address of Virtual DMZ Host	Enter the IP Address of the DMZ host.

4.6.3 Firewall

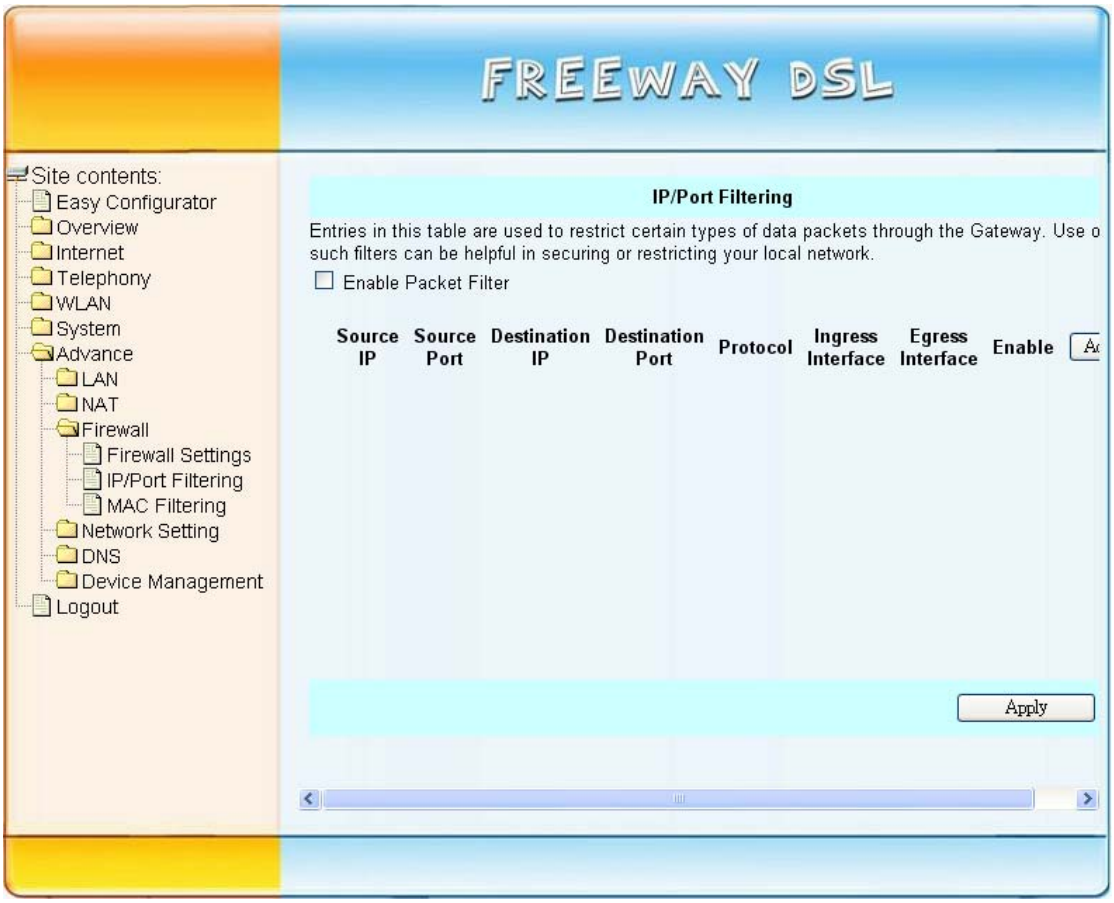
4.6.3.1 Firewall Settings

This page allows you to enable or disable firewall feature.



4.6.3.2 IP/Port Filtering

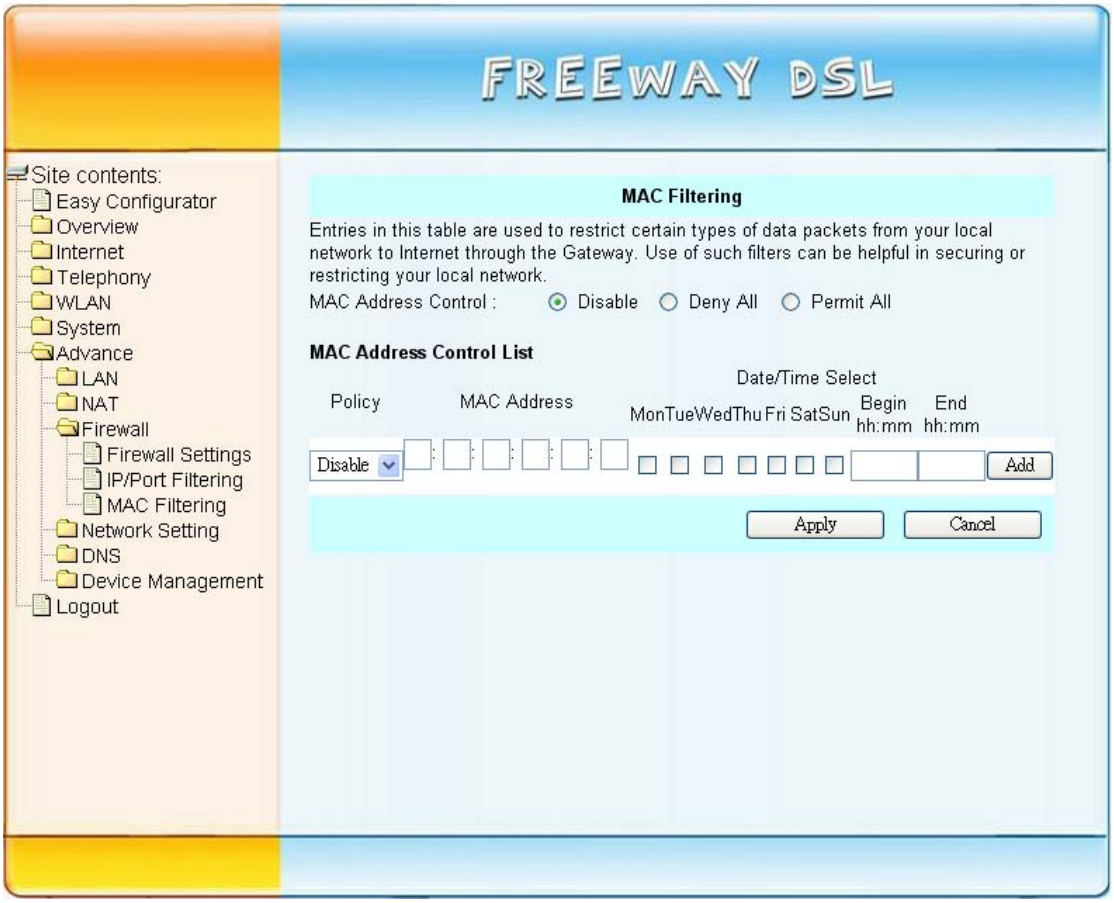
This page allows you to restrict specific data packets through the Freeway DSL.



Field	Description
Enable Packet Filter	To enable or disable the Packet Filtering feature of Freeway DSL. To enable, select the check box.
Source IP	Filter IP Address range of the local machine under Freeway DSL.
Source Port	Filter Port number range of the local machine under Freeway DSL.
Destination IP	IP address of the destination.
Destination Port	Port address of the destination.
Protocol	This is used for filter protocol. Select TCP or UDP to filter the protocol type packets from the local machines.
Ingress Interface	Input interface of the packet.
Egress Interface	Output interface of the packet.
Enable	To provide more IP Addresses of the WAN interface.
Add	On pressing **Add** button, the screen shown in next page is displayed. The options available in the **Add a Packet Filtering Rule** window are described in next page.

4.6.3.3 MAC Filtering

This page allows you to define rules to allow or deny specific packets through the Freeway DSL based on source MAC address, destination MAC address and traffic direction.

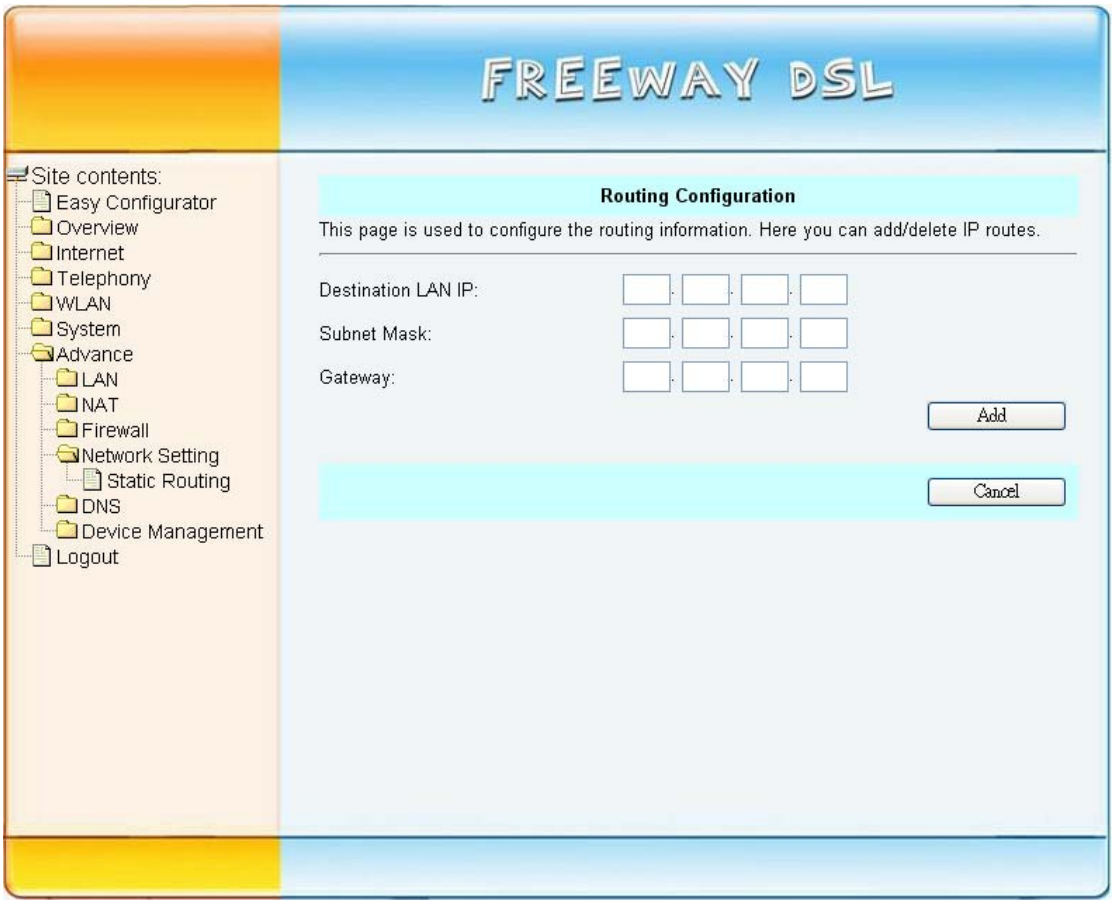


Field	Description
MAC Address Control	To disable, deny all or permit all the MAC address control.
MAC Address Control List	
Policy	To specify whether the particular MAC address is disabled, denied or permitted.
MAC Address	To assign the blocking MAC address for local machine.
Date/Time Select	To select the day(s) and time slot when the policy has to be applied on the MAC address provided. The **Begin** time entered should not be later than the **End** time and should be in the 24 hour format (hh:mm).
Add	Click this button to add the specified MAC address entry in the list.

4.6.4 Network Setting

4.6.4.1 Static Routing

The Routing page allows you to define specific route for your Internet and network data. Most users do not need to define routes. On a typical small home or office LAN, the existing routes that set up the default gateways for your LAN hosts and for the Freeway DSL provide the most appropriate path for all your Internet traffic.

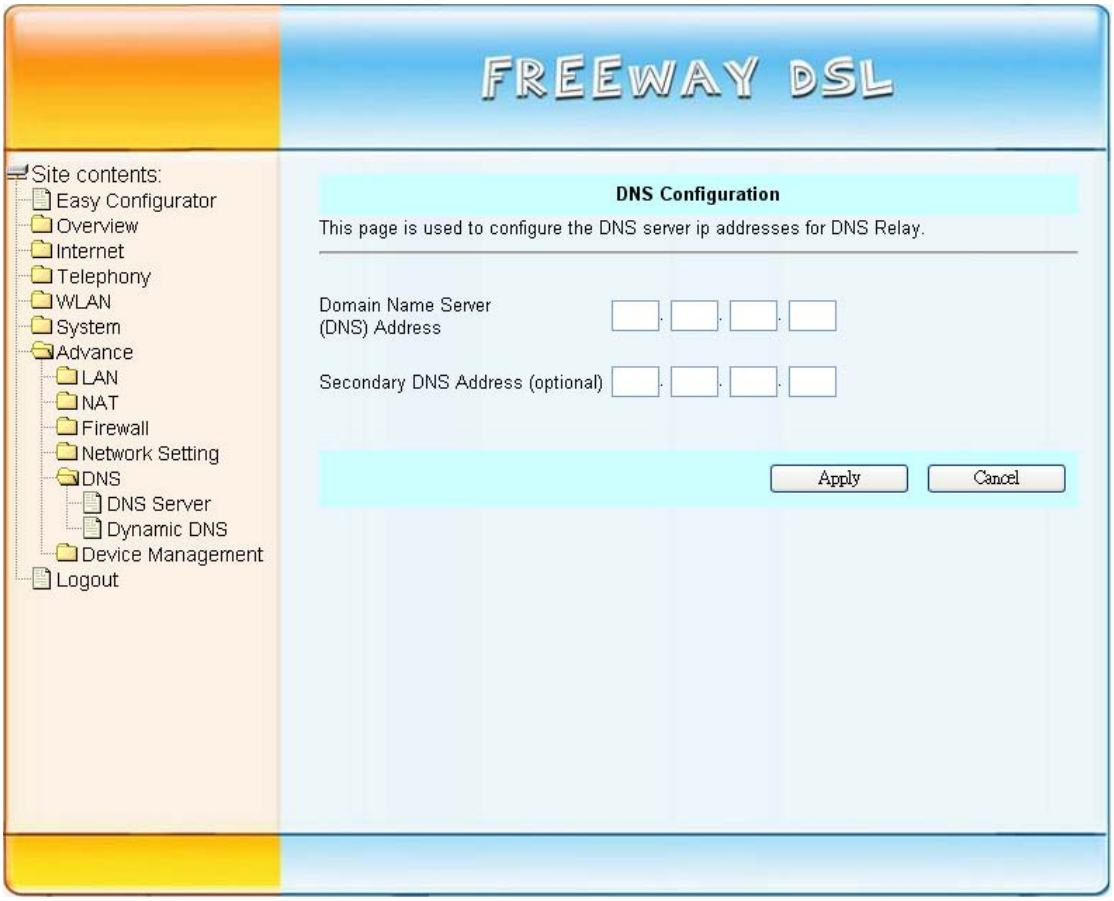


Field	Description
Destination LAN IP	To enter the IP Address of routing entry.
Subnet Mask	To enter the Subnet Mask of routing entry.
Gateway	To enter the Gateway address of routing entry.

4.6.5 DNS

4.6.5.1 DNS Server

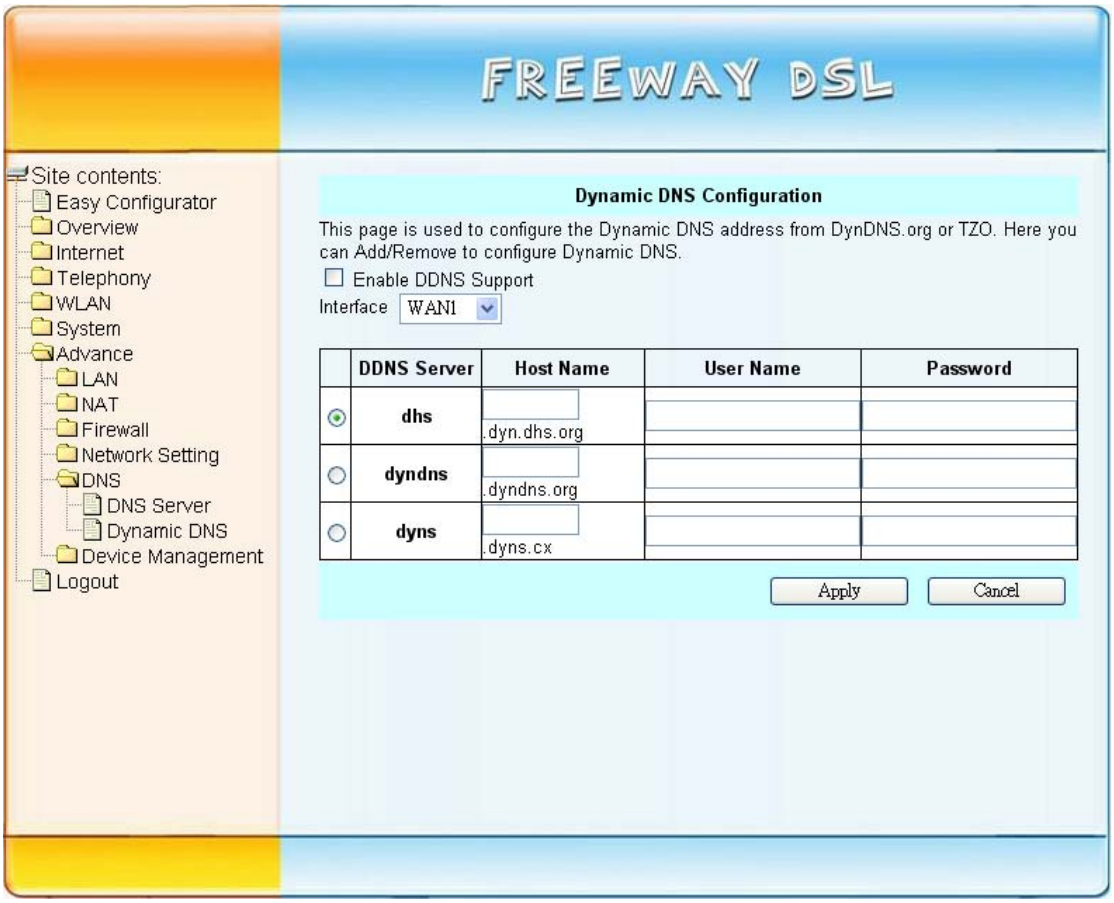
This page allows you to configure the DNS server IP address.



Field	Description
Domain Name Server (DNS) Address	Enter the DNS address of the primary DNS server.
Secondary DNS Address (optional)	Enter the address of the secondary DNS server, if available.

4.6.5.2 DDNS (Dynamic DNS)

Each time your device connects to the Internet, your ISP assigns a different IP address to your device. In order for you or other users to access your device from the WAN-side, you need to manually track the IP that is currently used. This page allows you to register your device with a DNS server and access your device each time using the same host name.

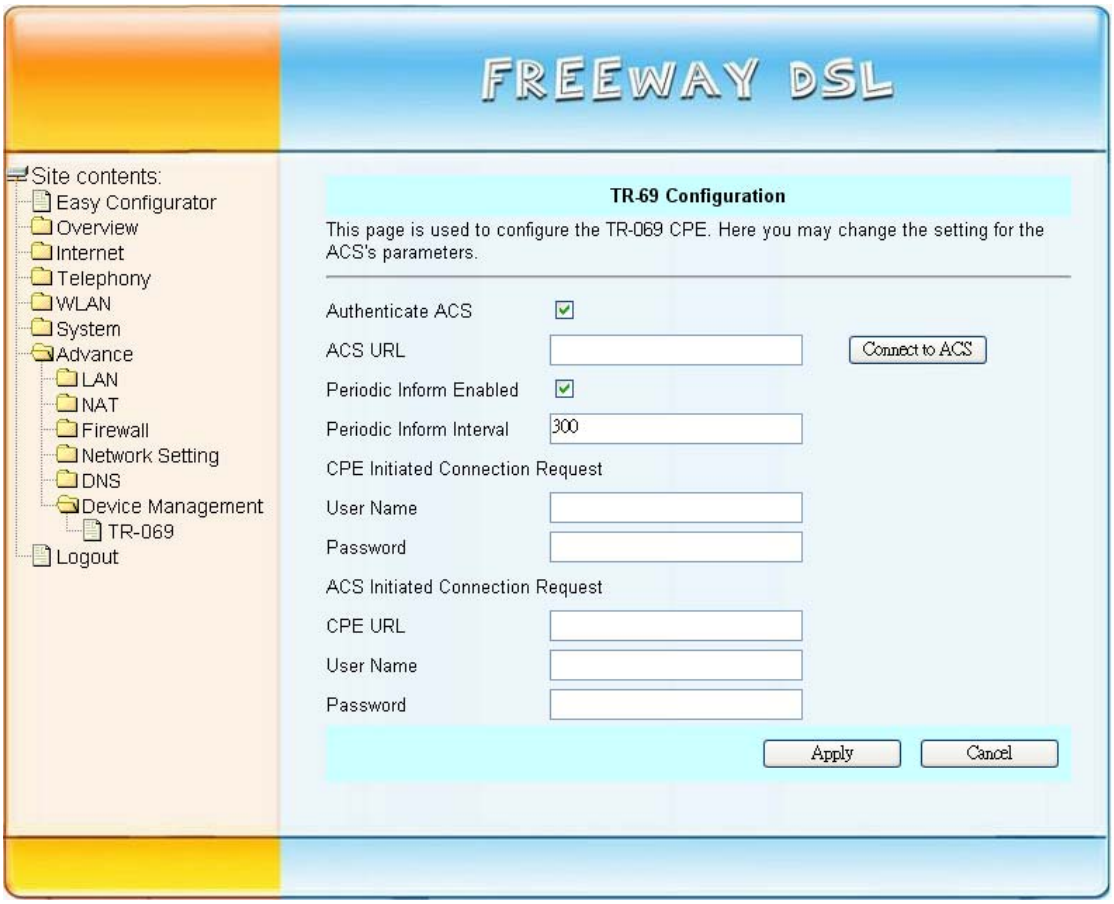


Field	Description
Enable DDNS Support	Used to enable the Dynamic Domain Name Server support.
Interface	Choose one from the drop-down list. DDNS is enabled or disabled on a PVC interface basis.
Select DDNS Server	
dhs/syndns/dyns	For this server you have to specify: • **Host Name**: The domain name to be registered with the DDNS server. • **User Name**: The user name of your registered account. • **Password**: The password or key of your registered account.

4.6.6 Device Management

4.6.6.1 TR-069

The TR-069 (CPE WAN Management Protocol) function can secure remote host access to your Freeway DSL from LAN and WLAN interfaces for some services provided by it.



Field	Description
Authenticate ACS	Check to enable the authentication to ACS.
ACS URL	To enter the ACS URL (HTTP Address and Port Number). The URL can be either http or https.
Periodic Inform Enable	Check to enable periodic inform of ACS authentication.
Periodic Inform Interval	To enter the inform interval time.
CPE Initiated Connection Request	
User Name	User Name for authentication to ACS.
Password	Password for authentication to ACS.
ACS Initiated Connection Request	
CPE URL	To enter the URL of CPE.
User Name	User Name for authentication to ACS.
Password	Password for authentication to ACS.

Appendix A. Troubleshooting

Below is a list of commonly asked questions. Before calling technical support, please look through these issues to see if they help solve your problem.

The Freeway DSL is not functional.

1. Check to see that the POWER LED is lit and than the network cables are installed correctly. Refer to the Quick Start Guide for more details.
2. Check to see that the LAN and WAN LEDs are lit.
3. Check the settings on your PC. Again, refer to the Quick Start Guide for more details.
4. Check the Freeway DSL's settings.
5. From your PC, can you PING the Freeway DSL? Assuming that the Freeway DSL has DHCP enabled and your PC is on the same subnet as the Freeway DSL, you should be able to PING the Freeway DSL.
6. Can you PING the WAN? Your ISP should have provided the IP address of their server. If you can ping the Freeway DSL and your protocols are configured correctly, you should be able to ping the ISPs network. If you cannot PING the ISPs network, make sure your using the correct protocols with the correct VPI/VCI values.
7. Make sure NAT is enabled for your connection. If NAT is disabled you the Freeway DSL will not route frames correctly.

I can't connect to the Freeway DSL.

1. Check to see that the POWER LED is lit and that the network cables are installed correctly.
2. Make sure that your PC and the Freeway DSL is on the same network segment. The Freeway DSL's default IP address is 10.10.10.250. If you are running a Windows based PC, you can open a DOS window and type IPCONFIG; make sure that the network adapter that is connected to the Freeway DSL is within the same subnet.
3. Also, your PC's Subnet Mask should match the Freeway DSL's subnet mask. The Freeway DSL has a default subnet mask of 255.0.0.0.
4. If this still does not work, press the RESET button. This will place the Freeway DSL into its factory default state. Go through the above procedures again.

The DSL LED continues to blink but does not go solid.

1. Make sure you have DSL service. You should get some kind of information from your ISP which states that DSL service is installed. You can usually tell if the service is installed by listening to the ADSL phone line; you will hear some high-pitched noise. If you do not hear high-pitched noise, contact your ISP.
2. This means that the DSL line is trying to train but for some reason it cannot establish a valid connection. The main cause of this is that you are too far away from the central office. Contact your DSL service provider for further assistance.
3. Verify that the DSL line is connected directly to the wall and to the line input on the Freeway DSL.

Appendix B. Specification

Physical Interface
- One ADSL port for WAN
- Four 10/100 Mbps Fast Ethernet ports for LAN
- IEEE 802.11 b/g Wireless AP with WPS auto setup
- Two VoIP FXS ports and one FXO port for emergency

ADSL Compliance
- Support Multi mode standards (ANSI T1.413 Issue 2, G.dmt, G.lite)
- ADSL2 G.dmt.bis (G.992.3)
- ADSL2 G.lite.bis (G.992.4)
- ADSL2+ (G.992.5)
- Reach Extended ADSL (RE ADSL)

ATM Protocols
- 15 PVCs Support
- Adaptation Layers AAL5, AAL2 and AAL0 Support
- OAM F5 Loopback

PPP Support
- PPP over ATM PVC (RFC 2364&RFC1577)
- PPP over Ethernet (RFC 2516)
- PAP (Password Authentication Protocol), CHAP (Challenge Handshake Authentication Protocol) and MS-CHAP (Microsoft Challenge Handshake Authentication Protocol)

Networking Stack
- NAT: Static Port Mappings, NAT Policies, UPnP NAT Traversal
- Packet backbone: ICMP, ARP, RARP, UDP, TCP, Multicast, IPv4, QoS, DHCP Client / Relay / Server, DNS Relay / Proxy, ToS Bits, IGMP Proxy
- Bridging: IEEE 802.1d Bridge
- Routing: Static route, RIP v1 / v2

Firewall / Security
- SPI (Stateful Packet Inspection) Firewall / Secure session management
- Packet Filtering
- Port Forwarding DMZ
- IPSEC / PPTP Pass through
- IP and MAC Spoofing Protection
- Secure Shell (SSH) v2

Quality of Service (QoS)
- Constant Bit Rate (CBR), Real-Time Variable Bit Rate (VBR-rt)
- Non-Real-Time Variable Bit Rate (VBR-nrt)
- Unspecified Bit Rate (VBR)

Wireless
- Standards: IEEE 802.11b/g
- Frequency Band: 2.300 to 2.500 GHz ISM band
- Modulation: OFDM with BPSK, QPSK, 16 QAM, 64 QAM
- FEC Coding Rates: 1/2, 1/3, 1/4
- Hardware Encryption: AES, TKIP, WEP
- Quality of Service: 802.11e draft
- Supported Bit Rate: 54M, 48M, 36M, 24M, 18M, 12M, 11M, 9M, 6M, 5.5M, 2M, 1Mbps
- WPS support for easy client setup

Voice over IP Protocols
- RFC 2976 SIP INFO
- RFC 3261 SIP V2.0

Voice Codecs
- G.711 Appendix 1, 2
- G.723.1A
- G.726
- G.729AB

Fax Protocol
- T.38U

NAT Traversal
- STUN
- Out-bond Proxy

CID Generation
- Bellcore / NTT / ETSI

Voice Application Features
- Generation Application Features
  - Handling of 10 SIP Accounts
  - Display name and address
  - SIP Network re-registration
  - Analyzing network environment
  - Debugging options, especially SIP
- DTMF
  - Inband
  - SIP INFO method
  - RTP Payload
- Basic
  - Tone generation / Dectection
  - Echo cancellation
  - CID generation (Calling ID)
- Call Features
  - Hold / Retrieve
  - Transfer
  - Conferencing
  - Waiting
  - Completion on busy subscriber
  - Deflection
  - Forwarding unconditional
  - Forwarding busy
  - Forwarding no response
  - E.164 numbering plan support
  - Anonymous call

Environmental Specification
- Power Input: Device input power at 12VDC/1.5A
- Power Consumption: 9.54W
- Operating Temperature: 0 °C to 40 °C
- Humidity: 95% non-condensing